Intel Sonoma Mobile Platform | **Gigabyte Dual 6600 SLI** | **NVIDIA nForce4 Ultra Roundup**

A Sandhills Publication

CPU®
COMPUTER POWER USER

Q&A With Cary Sherman

Justice & the RIAA
(page 108)

BIOS Boosters
Disable, Enable & Overclock
(page 66)

2005's Antivirus Apps Reviewed
(page 74)

Working With Your Linux Processes
(page 98)

WiMAX
Wired & Wireless Drawbacks & Benefits
(page 83)

BOOST YOUR PC'S PERFORMANCE

page 52

Mod Your PC
To Run Faster

ONE WICKED PC
Open The Puzzlebox On Page 40.

March 2005 • Vol. 5 Iss. 3

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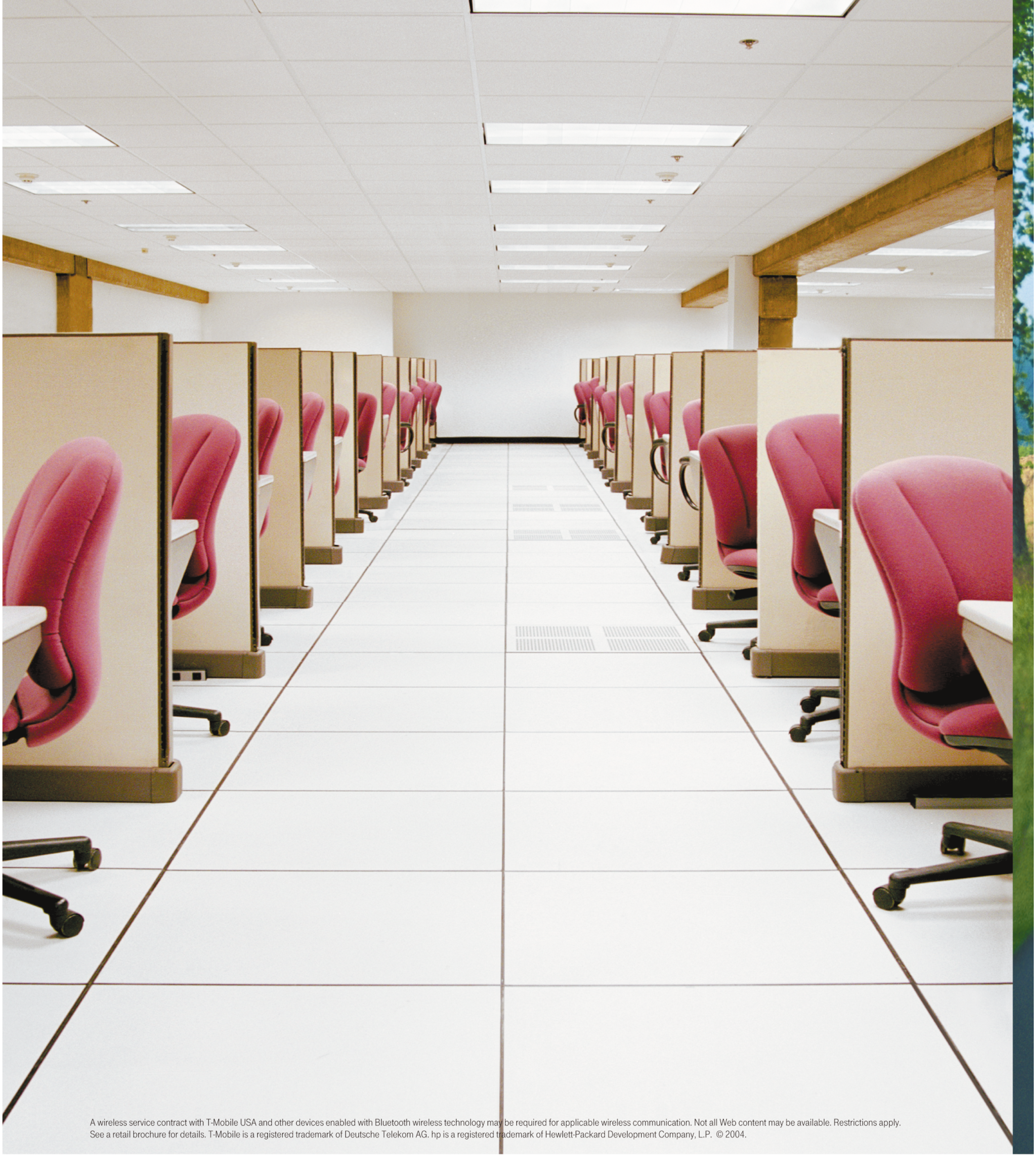

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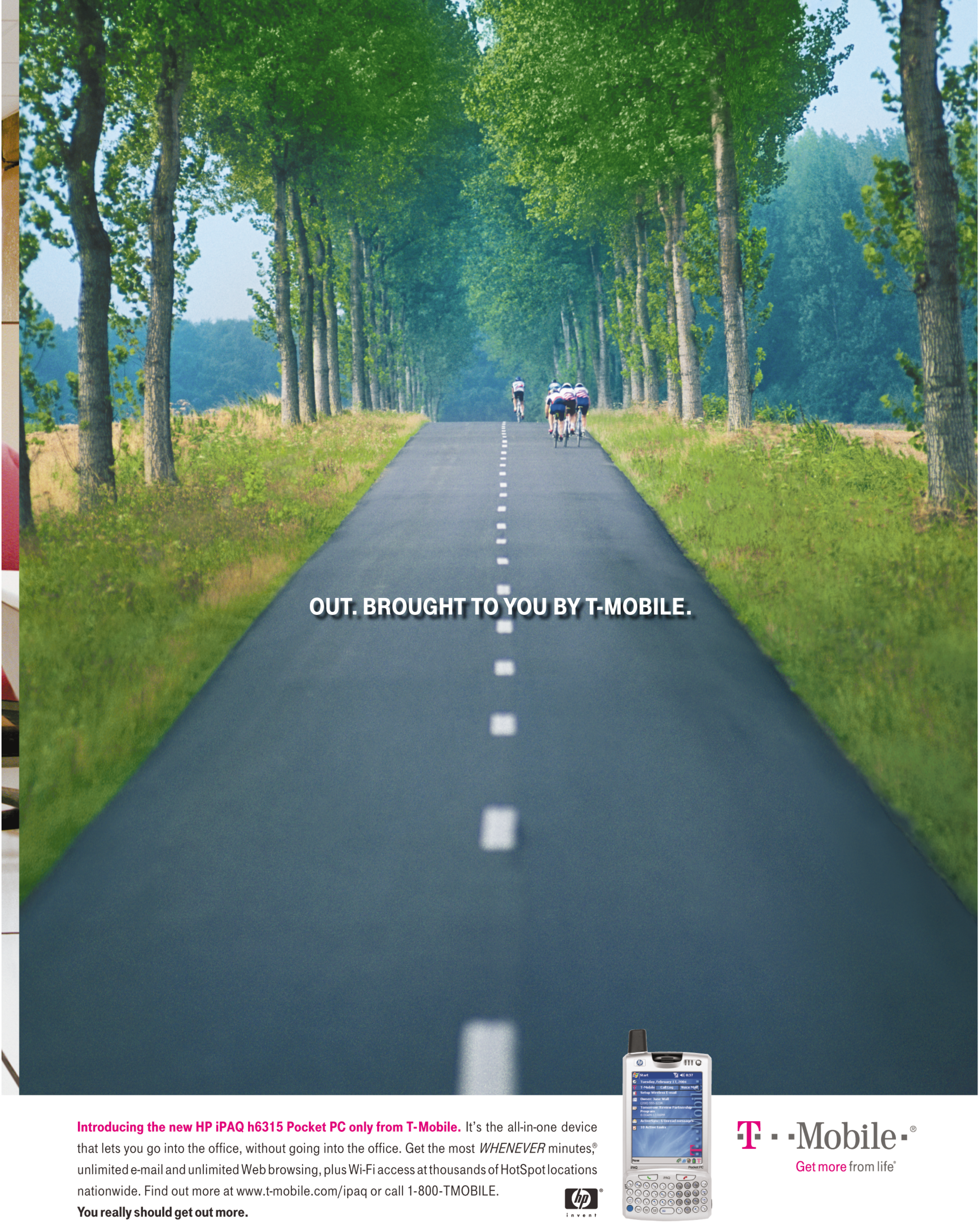

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Boost Your PC's Performance

Spotlight

52 **3 . . . 2 . . . 1 . . . Mod!**
Boosters That'll Blast Your System's Performance

60 **Boost Windows XP**
Tweak Your Way To Faster WinXP Performance

66 **BIOS Performance Boosters**
Your 20-Minute Configuration Workout

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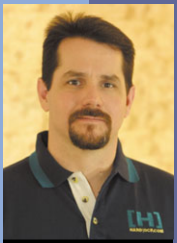
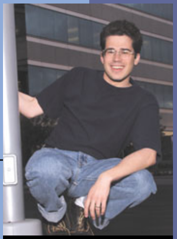
Frontside

6 What's Happening
12 Digital Economy
16 The Saint
Mobile Gaming

The Experts

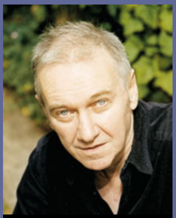
Joan Wood
Forward Slash
page 87


Kyle Bennett
[H]ard Talk
page 34


Chris Pirillo
Dialogue Box
page 80

Alex St. John
The Saint
page 16

Anand Lal Shimpi
Anand's Corner
page 32


Mike Magee
Shavings From The Rumour Mill
page 101

Alex "Sharky" Ross
The Shark Tank
page 33

Rob "CmdrTaco" Malda
The Department Of Stuff
page 86

Pete Loshin
Open Sauce
page 82

Did you find the hidden CPU logo on our cover? Turn the page for the answer.

Heavy Gear

17 **Dream Hardware**

18 **Give Your Megapixels Some Love**
Inkjet Printers For Your Photo-Printing Consideration

22 **Mini-Roundup: NVIDIA nForce4 Ultra Boards**

24 **Head Into Battle With x800 XL**
All-In-Wonder X600 Pro

25 Total Bithead Mobile Amplifier
D-Link DCS-3220G Internet Camera
GIGABYTE 3D1 GeForce 6600 GT SLI

28 **A Tale Of Two SFF Innovations:**
Biostar vs. Foxconn

30 Creative Audigy 2 ZS Notebook
NVIDIA's PureVideo Technology

31 Intel's Sonoma Mobile Platform

Web Creative Labs GigaWorks ProGamer G500

32 **Anand's Corner**
Apple's Mac mini

33 **The Shark Tank**
TurboCache

34 **[H]ard Talk**
Upgrading In 2005

Hard Hat Area

PC Modder

36 **Tips & Tutorials**

37 **Modding Techniques**
Prevent Mishaps With Preparation, Precaution & Planning
40 **Mad Reader Mod**
Acrylic + Wood + Mannequin Head = One Creepy PC

42 Advanced Q&A Corner
46 **X-ray Vision: Phase Change CPU Cooling**
The Materials They Are A-Changin'
48 **White Paper: Round 2: ATI & NVIDIA Throw New Chipsets Into the Athlon 64 Ring**
Radeon Xpress 400 & nForce4 Offer Impressive Features

Loading Zone

72 **The Bleeding Edge Of Software**
Inside The World Of Betas
73 **Up To Speed**
Upgrades That'll Keep You Humming Along
74 **2005's Antivirus Apps Unveiled**
The Battle Isn't Just Against Viruses Anymore
77 Eudora 6.2
602 Software 602 LAN Suite 2004
78 **Battle Of The Free Email Clients**
Mozilla Thunderbird vs. Outlook Express: Fight!
79 Adobe Premiere Elements
ScanSoft PaperPort Professional 10
80 **Dialogue Box**
Searching Seems To Be The Hardest Word
82 **Open Sauce**
My Knoppix Adventure

Caught In The Web

83 **Hello Wireless**
Will Broadband Go Wireless?
Web **Coder's Corner:**
Create Custom Simple Types
86 **The Department Of Stuff**
Flyincar.txt
87 **Forward Slash**
Network-Centric War Games

Digital Living

88 **Road Warrior**
New Vonage VoIP Phones, TimeTrax Does iPod, Cell Phones & DNA, Cingular's New 3G Network & More From The Mobile Front
90 **At Your Leisure**
Plug In, Sit Back & Fire Away

Tips & Tricks

97 **Software Tips & Projects**
Microsoft Gets Its Photo Story Straight
99 **Warm Up To Penguins**
Working With Processes

What's Cooking

101 **Shavings From The Rumour Mill**
Digital Home Can Snare Your Media
102 **Technically Speaking**
An Interview With Alex Lightman, Charmed Technology's Fashion Guru
106 **Under Development**
A Peek At What's Brewing In The Laboratory

Back Door

108 **Q&A With Cary Sherman**
Justice & The RIAA

Infinite Loops

Strange stats and other oddball items from computing's periphery

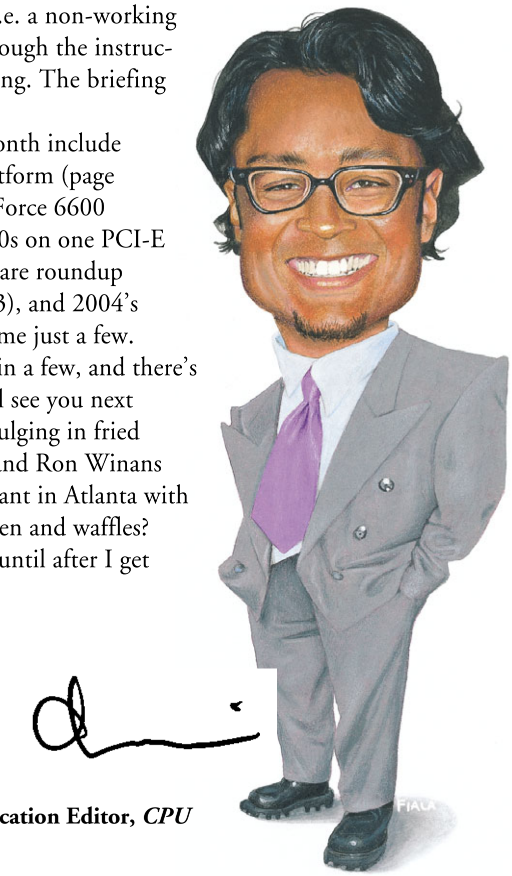
83, 97, 99

GREETINGS FROM SAMITLAND

Welcome back; I hope you guys all weathered the flu season better than I did. I came down hard and missed four days of work; some may suggest that is a good time to spend some QT with one's PCs, but I was truly out for the count. There are few things more painful than being home for four days without the strength to spend time with your PC. Ouch. (OK, so I'm being over dramatic. In the larger scope of things, there are plenty far worse fates, so let's not forget about this little link where we can help those less fortunate than us: www.redcross.org/donate/donate.html). Sandhills Publishing donated more than $14,000 toward the tsunami relief effort courtesy of employee donations and a $2-for-$1 match from the top. I thought that was pretty cool; we should all try to do our bit, right?

Onto all things tech. This month our Spotlight story comes in at a whopping 19 pages. It's time to knock your PC's performance up a few notches (BAM!), and we focus in on the details in three areas: Hardware, Software, and the BIOS. Be forewarned that some of these performance boosts can cause hardship and grief (i.e. a non-working PC), so be sure to read through the instructions carefully before starting. The briefing begins on page 52.

Other highlights this month include Intel's Sonoma Mobile Platform (page 31), GIGABYTE 3D1 GeForce 6600 GT SLI (page 25; two 6600s on one PCI-E card), 2005 antivirus software roundup (page 74), WiMax (page 83), and 2004's best games (page 94) to name just a few. Well, we're going to print in a few, and there's plenty work to be done. I'll see you next month, hopefully after indulging in fried chicken at Gladys Knight and Ron Winans Chicken & Waffles restaurant in Atlanta with wife Julie. Hey, fried chicken and waffles? LOL. But I'll have to wait until after I get into shape. Darn.



Samit G. Choudhuri, Publication Editor, *CPU*

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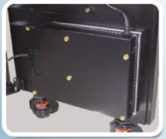
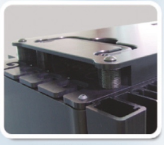

Fanless Power Supply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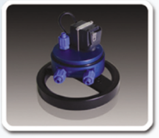
ZM-WB2 Gold

VGA Water Block
ZM-GWB1 (option)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(Built into Reserator)

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ULTRA QUIET CPU COOLER CNPS7700

Supports both Intel & AMD (Socket 775, 478, 754, 939, 940)

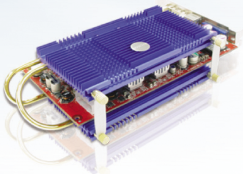
- Does not generate noise or vibration in Silent Mode.
- Pure Copper and Pure Aluminum base materials ensure excellent heat dissipation.
- Intel Pentium 4 (Socket 478/775), AMD Sempron/ AMD64 (Socket 754/939/940) compatible design for broad compatibility.
- 120mm fan inside the FHS maximizes airflow and makes installation easier.
- Adjustable fan speed controller (FAN MATE 2) enables control of noise and fan performance.

QUIET CPU COOLER CNPS7000B/LED

Supports both INTEL & AMD (Socket 478, 462, 754, 939, 940)

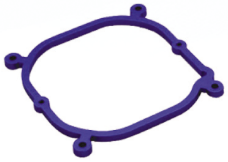
- Does not generate noise or vibration in Silent Mode.
- Pure Copper and Pure Aluminum base materials ensure excellent heat dissipation.
- 92mm fan inside the FHS maximizes airflow and makes installation easier.
- Adjustable fan speed controller (FAN MATE 2) enables control of noise and fan performance.
- To use this product on Socket 775, ZM-CS1 must be purchased separately.

QUIET VGA COOLER ZM80D-HP

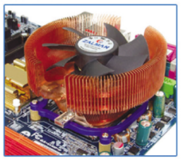


- This product was designed to optimize heat dissipation for excellent cooling performance.
- Dual heatpipes increase heat transfer speed and enhance the cooling efficiency.
- The fanless design ensures completely noiseless and maintenance-free operation.
- RAM heatsinks for cooling the VGA RAM.
- Optional ZM-OP1 recommended for higher-end VGA cards.

OPTION CLIP SUPPORT ZM-CS1



- This Clip Support allows the installation of CNPS7000 series onto Socket 775



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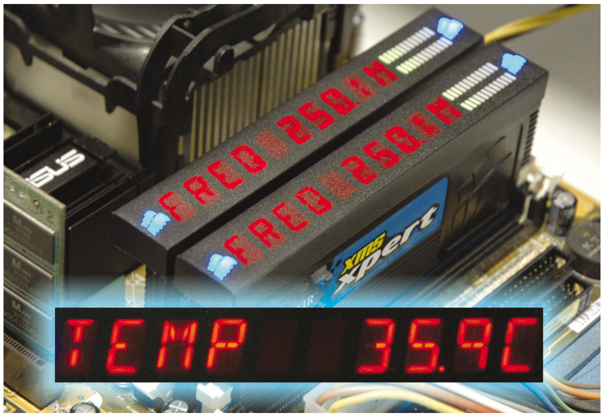
Compiled by
Kyle Schurman

Linksys Routers Pull Multiple Gs

The newly announced Wireless-G Broadband Router with SRX (WRT54GX) looks like a cross between a new-tech router and an old-tech TV set with rabbit ear antennae. The router promises wireless network connections that reach up to three times farther and with throughput up to eight times faster than standard 802.11g networking. The new SRX (Speed and Range eXpansion) technology uses two Wi-Fi-G radios and three antennae to send MIMO (Multiple In, Multiple Out) signals, which multiply data streams on the same frequency. The $199 router and access point combo works with all 802.11b/g-compatible devices; however, to get the most from the WRT54GX configuration, it should be paired with other Linksys SRX products such as the $129 Wireless-G Notebook Adaptor (WPC54GX) . . . or perhaps a black-and-white RCA TV from 1959. ▲

Linksys' new SRX technology employs three antennae and two radios to multiply Wi-Fi-G speed up to eight times.



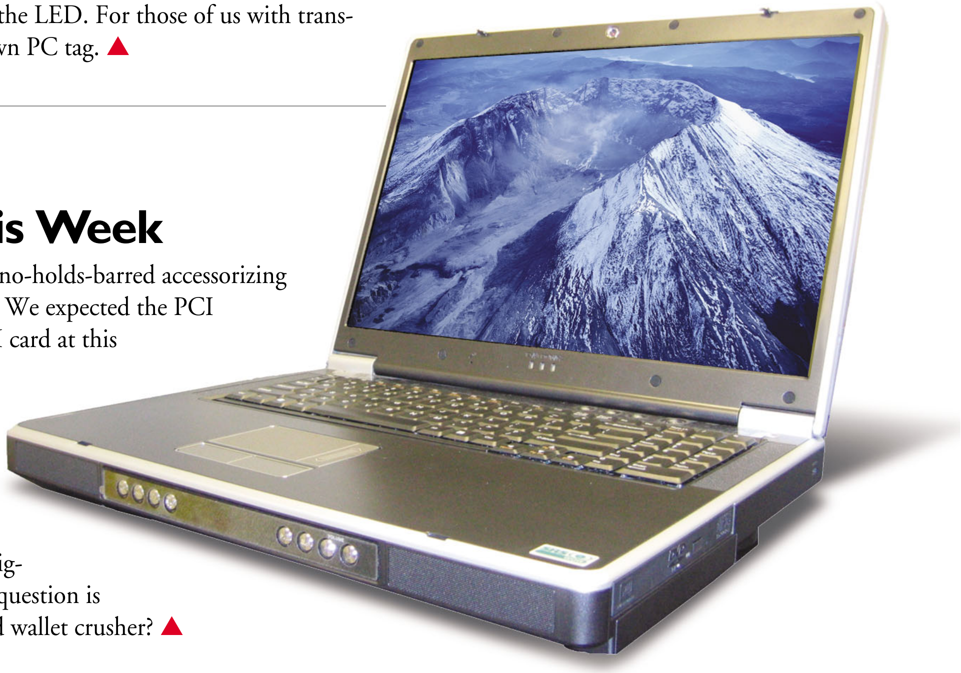
Corsair offers modders the next level of flash—memory with a message.

Corsair's XMS Xpert Memory Talks Back

We've heard of writing data to memory but never having memory write us back. After delighting PC modders with its XMS Pro line of memory modules with LED activity lights, Corsair blows us away with an XMS Xpert line that uses LEDs to spell out the voltage, temp, and frequency status of its top-of-the-line memory. The LED marquees attach to the modules and get status information via a microcontroller and sensors. Corsair will release the DDR2 parts sometime soon in the most-popular speeds at slightly higher pricing than the current XMS Pro line. Furthermore, users can even program the message that appears on the LED. For those of us with transparent cases, this is like digital graffiti. Write your own PC tag. ▲

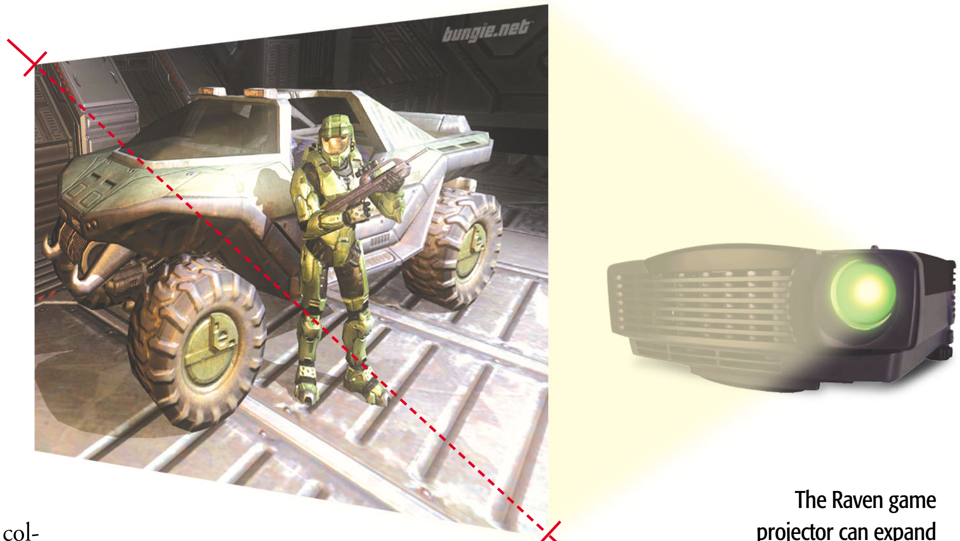
King Of The Laptop Mountain . . . This Week

Even jaded *CPU* editors were a bit awestruck by the no-holds-barred accessorizing on PC Laptop's upcoming PCL 987 "K-2" portable. We expected the PCI Express motherboard and 256MB NVIDIA x16 PCI card at this point, but we really wanted to see that promised HDTV output jack that runs ultra-hi-res images on a next-gen TV. Or we'll just stick with the 17-inch (yes, 17-inch) WSXGA (1,680 x 1,050) LCD and do some videoconferencing with the built-in PC camera (yes, a cam). The 3.6GHz Pentium 4 CPU and RAID hard drive configuration surely can push all of this hardware, but the question is how far can you lug this 12.5-pound, $3,499 lap and wallet crusher? ▲



Halo 2

Gets Even Bigger



With over 6 million copies sold, Microsoft's Xbox mega-hit Halo 2 is about to get even bigger when you play on Boxlight's (www.boxlight.com) new Raven Game Projector. The 4.5-pound unit takes a direct connection from an Xbox to project game images as large as 200 inches diagonally. The Raven uses DLP image technology to create 800 x 600 SVGA resolutions at 16.7 million colors and a 2000:1 contrast ratio. The rig also accepts HDTV signals and 16:9 aspect ratios, so you can shift Halo into widescreen mode for that full IMAX experience. Of course, gaming on this scale is going to cost you—a sweet $1,399. But we're guessing that Master Chief gets paid pretty well for saving the universe. ▲

The Raven game projector can expand Master Chief's heroism up to 200 inches diagonally.

Hardware Mole

Bravo ASUS! Vento Que Bello.

ASUS usually delivers rock-solid, high-performance motherboards and video cards, but now it is aiming for high-style and the high-end gaming market with the tricked-out Vento 3600 case. Resembling an upright Lamborghini racer, Vento has a unique flip-top cover; press the lid and it slowly lifts to reveal the drive bays. Front and rear fans, as well as a side vent, ensure ventilation for overclockers. And obsessive upgraders (that would be us) will appreciate the screwless PCI slot covers and lock devices for securing external devices in the drive bay. Ah, perfect for those *CPU* lab pit stops.

The ASUS Vento is one of the first cases we have seen that is designed to flip its lid.

Blu-ray Gets Game, HD-DVD Gets Movies

Blu-ray is battling HD-DVD as the standard for next-gen optical disc format in home theater and PCs, and neither side is blinking. Sony-supported Blu-ray got a boost in January when Electronic Arts (The Sims 2) and Vivendi Universal Games (Half-Life 2) announced that they will publish titles on the format. Meanwhile, NEC and Toshiba swung their support to HD-DVD, saying they will include compatible drives in some upcoming models, and some Hollywood studios already plan to release HD-DVD discs next Christmas.

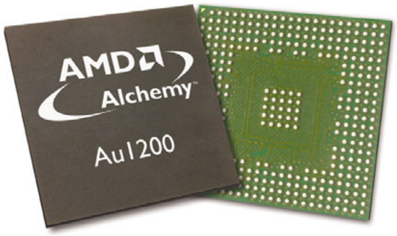
Rethinking Our E-Junk

The computer age has left us with a mounting pile of e-waste and little guidance about disposing of rechargeable power cells, CRTs, and the like. And so, eBay, the home of cast-off items, launched the Rethink Initiative (www.ebay.com/rethink). The effort partners with hardware manufacturers, environmental groups, and government agencies to find smarter ways of discarding and refurbishing the 400 million computers that the group says will be replaced worldwide just in the next three years. Go to the new site for extensive FAQs and forums on recycling that forgotten monitor you're still using for a hat rack.

Compiled by DeanTakahashi

AMD Goes After Personal Video Players

AMD's Alchemy Au1200 processor targets the PMP market. The company hopes that the combination of the high-speed MIPS architecture, running at 333, 400, and 500MHz, and low-power consumption of less than 400 milliwatts will provide customers with high-quality handheld video players. AMD acquired the chip architecture when it bought Alchemy in 2002. AMD has launched a couple of prior chips, but the newest chip is aimed at enabling a handheld player to run smooth video and even supply the source video to drive a large TV display, says Rob Oliver, product marketing manager. He also says the chip is able to display native DVD video and handle tasks such as transcoding, which would enable someone to transfer video directly from a DVR to a handheld without using the PC to convert the format. Furthermore, AMD rounded up several partners, Implicit Networks, FIC, and GoVideo, to help launch its Alchemy Au1200 processor. Products are expected to debut in the second quarter. ▲



Agere Systems Launches Storage Chip For Portable Disk Drive Devices

Agere Systems has created a chipset, dubbed TrueStore CE, for managing small-form-factor hard disk drives used in portable media devices. Manufacturers will now have access to integrated circuits adapted to the small size, low cost, and power savings required to create storage devices for digital cameras, mobile phones, music players, notebooks, handhelds, and other consumer electronics products. TrueStore has all the elements needed for small hard disk drives: preamplifier, motor controller, read-channel, and hard disk controller functions. It works with disk drives ranging from 1.8 to 0.85 inches in size. The chipset can support memory sizes up to 4GB, and later versions will accommodate up to 12GB. The chipset also consumes 400 milliwatts of power, which helps extend battery life. Also, the chipset has shock-resistance features and read-write speeds up to 350Mbps. ▲

Genoa Processors Enable More Colorful LCDs

Most TVs use three primary colors—red, green, and blue—when they create images. But Genoa Color Technologies in Herzlia Pituach, Israel, has figured out how to create a richer gamut of colors with chips that create images with five primary colors (including yellow and cyan). Genoa built its Keshet family of chipsets to sell to TV and display makers such as Uneed Systems. To take advantage of the five primaray colors, the chips convert the video signals, increasing brightness as much as 40% and widening color gamut by 35%. Genoa demonstrated true high-definition resolution in a variety of demos with Uneed Systems and MicroDisplay, and it expects display makers to begin selling products with the Keshet chipsets soon. ▲

Watching The Chips Fall

Here is pricing information for AMD and Intel CPUs.

Released	Original Price	Current Price	Last Month's Price
AMD Athlon XP 3200+ 400MHz FSB			
5/26/2003	$464**	$129	$151
AMD Athlon 64 2800+			
1/6/2004	$193**	$123	$127
AMD Athlon 64 3000+			
9/23/2003	$218**	$155	$144
AMD Athlon 64 3200+			
9/23/2003	$417**	$195	$194
AMD Athlon 64 3400+			
1/6/2004	$417**	$217	$220
AMD Athlon 64 3500+			
6/1/2004	$500**	$251	$267
AMD Athlon 64 3700+			
6/1/2004	$710**	$459*	$459*
AMD Athlon 64 3800+			
6/1/2004	$720**	$599	$599*
AMD Athlon 64 4000+			
10/19/2004	$729**	$729	$674*
AMD Athlon 64 FX-53			
3/18/2004	$733**	$598	$560
AMD Athlon 64 FX-55			
10/19/2004	$827**	$849*	$848*
Intel Pentium 4 3.2GHz 800MHz FSB			
6/23/2003	$637**	$255*	$229*
Intel Pentium 4 3.2GHz 800MHz FSB 1MB cache			
2/2/2004	$278**	$214	$213
Intel Pentium 4 3.4GHz 800MHz FSB			
2/2/2004	$417**	$269	$299
Intel Pentium 4 Extreme Edition 3.2GHz 2MB cache 800MHz FSB			
11/3/2003	$925**	$789	$1,023
Intel Pentium 4 Extreme Edition 3.4GHz 2MB cache 800MHz FSB			
2/2/2004	$999**	$1,322	$1,322
Intel Pentium 4 Extreme Edition 3.46GHz 2MB cache 800MHz FSB			
11/2/2004	$999**	$1,035*	N/A
Intel Pentium 4 520 2.8GHz 1MB cache 800MHz FSB 90nm			
6/27/2004	$178**	$163*	$163*
Intel Pentium 4 530 3.0GHz 1MB cache 800MHz FSB 90nm			
6/27/2004	$218**	$177*	$189*
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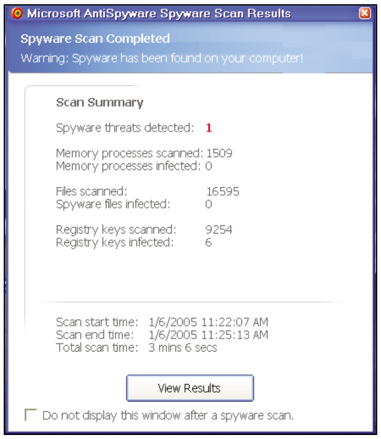
Intel Pentium 4 550 3.4GHz 1MB cache 800MHz FSB 90n			
6/27/2004	$417**	$278**	$309*
Intel Pentium 4 560 3.6GHz 1MB cache 800MHz FSB 90n			
6/27/2004	$637**	$413*	$425*
Intel Pentium 4 570 3.8GHz 1MB cache 800MHz FSB 90nm			
11/15/2004	$637**	$637**	N/A

* Retail price
** Manufacturer's price per 1,000 units

Other current prices, if indicated, are lowest OEM prices available through Pricegrabber.com

Microsoft Defends Its Borders

To some, it would appear nothing scares Microsoft worse than the prospect of losing even a sliver of its desktop monopoly. Millions of users are flocking to Mozilla's Firefox browser because it seems more secure and less susceptible to spyware than the ubiquitous Internet Explorer. Redmond strikes back with Microsoft Windows AntiSpyware, a free spyware killing utility now available in beta at Microsoft.com. Wonder of wonders, this freebie actually does a nice job of securing IE from many adware bogies and home page and search hijackers, at least in our informal first runs on several PCs. System scans produce a comprehensive list of potential spies, each annotated with a plain language description, a threat level, and a recommendation for removing or keeping the item. Automated updates maintain fresh spyware profiles. The real-time protection helps stop more spyware from piling in but also monitors your wireless connection for intruders and prevents outside machines from hijacking your system to send spam to others. Only time and detailed reviews will tell how Microsoft AntiSpyware stacks up against old faves, such as LavaSoft's Ad-Aware and Webroot's Spy Sweeper, but clearly this is one freebie everyone should try. ▲

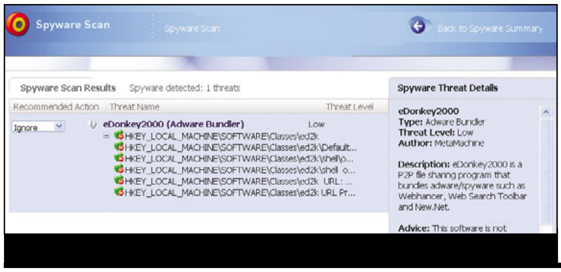


Spyware Scan Completed
Warning: Spyware has been found on your computer!

Scan Summary
Spyware threats detected: 1
Memory processes scanned: 1509
Memory processes infected: 0
Files scanned: 16595
Spyware files infected: 0
Registry keys scanned: 9254
Registry keys infected: 6
Scan start time: 1/6/2005 11:22:07 AM
Scan end time: 1/6/2005 11:25:13 AM
Total scan time: 3 mins 6 secs

☐ Do not display this window after a spyware scan.

Microsoft defends its browser monopoly by giving away a full-featured spyware killer that is designed to keep Internet Explorer's borders safe from invaders.



Spyware Scan Results Spyware detected: 1 threats

Recommended Action	Threat Name	Threat Level
Ignore	eDonkey2000 (Adware Bundler) HKEY_LOCAL_MACHINE\SOFTWARE\Classes\ed2k HKEY_LOCAL_MACHINE\SOFTWARE\Classes\ed2k\Default... HKEY_LOCAL_MACHINE\SOFTWARE\Classes\ed2k\shell\o... HKEY_LOCAL_MACHINE\SOFTWARE\Classes\ed2k\shell o... HKEY_LOCAL_MACHINE\SOFTWARE\Classes\ed2k URL: ... HKEY_LOCAL_MACHINE\SOFTWARE\Classes\ed2k URL Pr...	Low

Spyware Threat Details

eDonkey2000
Type: Adware Bundler
Threat Level: Low
Author: MetaMachine

Description: eDonkey2000 is a P2P file sharing program that bundles adware/spyware such as Webhancer, Web Search Toolbar and New.Net.

Advice: This software is not

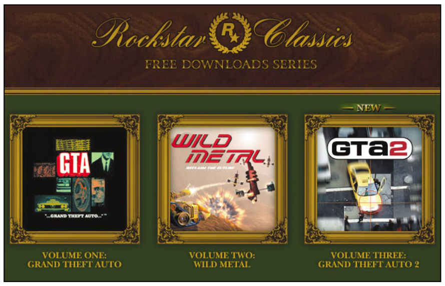
Software Shorts

Can Firefox Users Get Burned?

With 17 million downloads since its November release, the alternative Mozilla Firefox browser seems to have even mighty Microsoft on the run (see "Microsoft Defends Its Borders"). With success comes greater scrutiny, however, and as a result security monitor Secunia unearthed a Firefox 1.0 vulnerability that could let hackers misrepresent the source URL of a download. Although Secunia regards this bug as a fairly low-level security risk, it can help scam artists trick users into downloading malicious software. Ironically, as Firefox becomes more popular as a safer alternative to IE, it also becomes a more inviting target for the hackers its users are trying to avoid.

Grand Free Auto

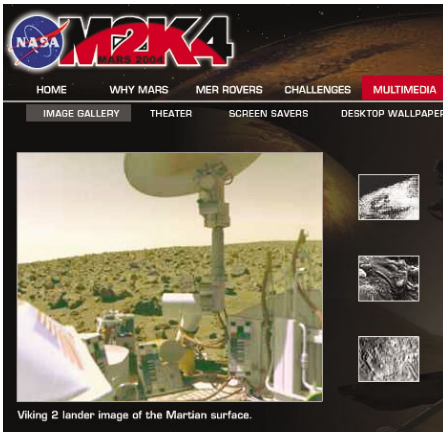
After making zillions of bucks (or thereabouts) by dealing its addictive and controversial Grand Theft Auto game series, Rockstar Games is givin' back to the hood. The company has released updated PC versions of Grand Theft Auto and GTA2 as free downloadables from the company's Web site (www.rockstargames.com/classics). The great free-roaming gameplay circa 1999 is still here but optimized for better performance on modern PCs. Perhaps by the time you read this the demand will ease at Rockstar's servers, which seem to be struggling from the traffic the last time we tried to nab these gems for ourselves.



Grand Theft Auto fans can relive the early console days on their PC . . . for free.

They Can't Even Give Bill Gates' Money Away

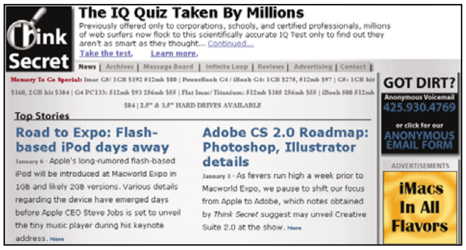
Millions of Californians probably missed their chance to claim a sliver of Bill Gates' money. As part of an antitrust settlement over its monopolistic practices in the state, Microsoft had agreed to disburse up to $1.1 billion to California residents who purchased any of its major programs between 1995 and 2001 in the form of vouchers that could be redeemed for most hardware or software. But according to the *Los Angeles Times*, experts estimated that only 700,000 of the 14 million eligible claimants in the state had applied for the free money as the deadline of Jan. 8, 2005 loomed. Lucky Bill.



Press-savvy NASA brands its Mars expedition M2K4 as part of a year-end review promotion.

NASA's Spacey Year

After the Columbia space shuttle disaster in 2003, NASA's public reputation took a beating, and so it's not surprising that its "Year in Review 2004" makes a compelling multimedia case for the space organization's recent wins: the Mars expedition, a satellite orbiting Saturn, and international space stations missions. The flash-based presentations feature galleries of breathtaking space images and seamless video presentations. This extravaganza is not exceptional at NASA.gov, which is one of the best-kept secrets online. Not at all geeky, the site can offer clever trailers that zip through NASA's coolest experiments or a video greeting at the home page from the current inhabitants of the international space station. Many of those slick animated simulations of space events that NASA supplies to TV networks are here, as are piles of hi-res space images and well-polished multimedia shows for the major space projects. One must-see feature is NASA TV, which lets you jack into the satellite video feed that NASA makes available to the media. When missions such as the Mars landing are in progress, this is the place to go for the raw feed or where you can see the daily exchanges between space station crews and ground control which, actually, can get a bit on the geeky side. ▲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ADVERTISEMENTS

The IQ Quiz Taken By Millions

Previously offered only to corporations, schools, and certified professionals, millions of web surfers now flock to this scientifically accurate IQ Test only to find out they aren't as smart as they thought... Continued...

Take the test. Learn more.

Memory To Go Special: Imac G5/ 1GB $192 512mb $88 | PowerBook G4 / iBook G4: 1GB $278, 512mb $97 | G5: 1GB kit $160, 2GB kit $384 | G4 PC133: 512mb $93 256mb $55 | Flat Imac/ Titanium: 512mb $105 256mb $55 | iBook 500 512mb $84 | 2.5" & 3.5" HARD DRIVES AVAILABLE

Top Stories

Road to Expo: Flash-based iPod days away

January 6 - Apple's long-rumored flash-based iPod will be introduced at Macworld Expo in 1GB and likely 2GB versions. Various details regarding the device have emerged days before Apple CEO Steve Jobs is set to unveil the tiny music player during his keynote address. More

Adobe CS 2.0 Roadmap: Photoshop, Illustrator details

January 3 - As fevers run high a week prior to Macworld Expo, we pause to shift our focus from Apple to Adobe, which notes obtained by *Think Secret* suggest may unveil Creative Suite 2.0 at the show. More

GOT DIRT?

Anonymous Voicemail 425.930.4769

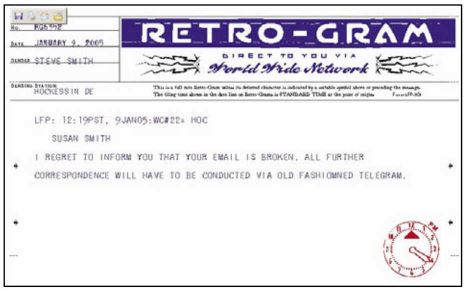
or click for our ANONYMOUS EMAIL FORM

iMacs In All Flavors

Apple bites back at the Mac rumor site ThinkSecret, which solicits anonymous tips and insider info from people in and around Apple.

Biting At Apple's Core?

The Mac insider news-and-rumor site ThinkSecret.com may have gotten a little too inside recently, and so Apple filed suit. The site published rumors that Apple was about to release a low-priced G4-Mac without a display, as well as an office software suite purportedly dubbed iWork. Both rumors proved true, but Apple claimed the site was colluding with company insiders and publishing information that could diminish the value of these products in the marketplace. Ironically, by suing ThinkSecret.com for revealing what the company claims are "trade secrets," "product code names," and "detailed technical specifications," Apple seemed to be confirming that the very rumors it wanted to contain are actually true. Why sue if the stories are idle speculation? ThinkSecret.com is unrepentant. A Got Dirt? badge on the front page invites technical pros to dish company secrets via anonymous email or voicemail. Apple says it is just trying to protect its proprietary information and find the source of the leaks. Just about every Presidential White House since Nixon's has tried plugging press leaks to no avail, but maybe Steve Jobs knows something Reagan, Clinton, and two Bushes didn't. ▲



No. RG6552

Date JANUARY 9, 2005

Sender STEVE SMITH

Sending Station HOCKESSIN DE

This is a full rate Retro-Gram unless its deferred character is indicated by a suitable symbol above or preceding the message. The filing time shown in the date line on Retro-Grams is STANDARD TIME at the point of origin.

LFP: 12:19PST, 9JAN05:WC#22= HOC

SUSAN SMITH

I REGRET TO INFORM YOU THAT YOUR EMAIL IS BROKEN. ALL FURTHER CORRESPONDENCE WILL HAVE TO BE CONDUCTED VIA OLD FASHIOMNED TELEGRAM.

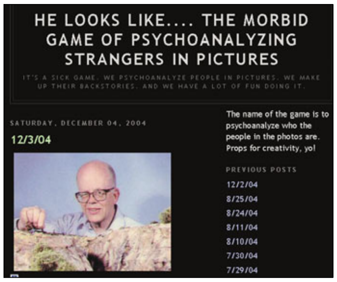
At Retro-Gram.com you can turn your messages into old-fashioned telegrams and send them via email or snail mail.

Email Goes Retro

If driving around in a PT Cruiser and chomping Johnny Rocket hamburgers isn't retro enough for you, then take the way-back machine to pretelephone days with Retro-Gram.com. This novel online service converts simple text messages into an old-style wired telegram, which you can email to a correspondent for free or snail mail for a $3.95 fee. The look and feel of authentic Western Union telegrams is here, including poorly placed typed characters and various time-stamps. Email recipients get a link to the message in PDF format, but for true authenticity, the company says it will also make hand deliveries in the United States for a custom fee (Reality-Grams). The hosting company, DataEmporium.net, and a graphic designer who collects antique printed ephemera such as vintage telegrams, cooked up the idea. It is all very cool, but you will also need to learn the lost art of brevity. In the predigital age, people paid for messages by the word, and so Retro-Gram.com limits you to 75 words per telegram, which is actually a lot like today's costly, abbreviated mobile text messaging. Hmmm. Everything new is old again. ▲

Am I Nutso . . . Or Just Geeky?

The new He Looks Like…. blog (helookslike.blogspot.com) invites us to engage in the slightly sick art of goofing on strangers. The site posts an image of a dorky or dangerous-looking person and invites visitors to craft their psychological back stories. For instance, there's "Louis, the guy no one wanted to let into the frat because he was way too eager, way too geeky and he always spit when he talked." Or, the guy who "looks like he lives where Teletubbies go to die." And those are the gentler portraits at a site that blends anonymous posts with anonymous targets to create a kind of quasi-acceptable meanness. The site labels this "the morbid game of psychoanalyzing strangers in pictures," the kind of wise-assery many of us already do with trusted friends when lounging in airports and parks. The Webmistress, also anonymous, has crafted her own condescending back story, as well. "She looks like a single and lonely chick who has a lot of time on her hands. If you want to date her, holla! But don't send a picture. She's evil." Well, as long as you're all right with that, we guess. ▲


HE LOOKS LIKE.... THE MORBID GAME OF PSYCHOANALYZING STRANGERS IN PICTURES

IT'S A SICK GAME. WE PSYCHOANALYZE PEOPLE IN PICTURES. WE MAKE UP THEIR BACKSTORIES. AND WE HAVE A LOT OF FUN DOING IT.

SATURDAY, DECEMBER 04, 2004

12/3/04

The name of the game is to psychoanalyze who the people in the photos are. Props for creativity, yo!

PREVIOUS POSTS

12/2/04
8/25/04
8/24/04
8/11/04
8/10/04
7/30/04
7/29/04

At the He Looks Like…. blog, you can goof on strangers, relatively guilt-free.

New On The 'Net

Show and Tell
Click any apron or browse the collection.

At Least I Had My Apron On

We don't actually remember our moms wearing aprons quite this loud and trippy, but the wonderful new online shop Kitsch'n Glam (www.kitchnglam.com) takes a few liberties with retro authenticity to deliver some hip-and-clever revisions of classic momhood. Former Web producer Anna Michelle Wang turned the funky apron designs she handmade as Christmas presents into a business. The wonderfully interactive site lets you highlight and explore a catalog of apron designs that look to be lifted from sets on the old "Laugh-In" show.

Do We Want Our ManiaTV?

Hoping to do for the Web what MTV did for cable, ManiaTV (www.maniatv.com) is a 24/7-live Internet TV Network. Youthful Cyber Jockeys host a ton of music videos with edgy titles such as "A.D.D. Afternoon" and "Pimpin' Personals." The stream is live at all times, and viewers use the Web site to vote on the playlist. To its credit, ManiaTV does actually jack into that early MTV vibe, when the music video flowed like water and the on-air talent was anything but polished.

The Becker-Posner Super Blog

When Nobel Prize winner in Economic Sciences, Gary Becker, and one of the most respected legal minds of our day, Richard Posner, post new items on the Becker-Posner Blog (www.becker-posner-blog.com), they aren't exactly ranting about the cafeteria lunch menu. This fascinating, intellectual tag team banters over economics of the recent Asian tsunami, AIDS policy, and global warming in lengthy, erudite, but always polite exchanges that make you feel as if you are eavesdropping at the Stanford faculty club.

BIOS Upgrades Available Online

Compiled by Kevin Savetz

Before you send another motherboard to the landfill, consider upgrading the BIOS and giving your PC a new outlook on life. Here are a few recently released upgrades. Readers can check out www.cpumag.com/cpumarch05/bios to see our entire upgrade list.

Motherboard	Date Available	URL
ABIT KV7	01/07/2005	www.ABIT-usa.com/downloads/bios/bios_revision.php?categories=1&model=125
ABIT IC7-G	01/10/2005	www.ABIT-usa.com/downloads/bios/bios_revision.php?categories=1&model=4
AOpen I855GMEM-LFS	01/11/2005	download.aopen.com.tw/userdownload_List.aspx?RecNo=9010&Model=i855GMEm-LFS
AOpen vKM266Pm	01/11/2005	download.aopen.com.tw/userdownload_List.aspx?RecNo=9012&Model=vKM266Pm
ASUS P4P800-X	01/07/2005	www.ASUS.com/support/download/item.aspx?ModelName=P4P800-X&Type=BIOS
ASUS P4P800S-X	01/05/2005	www.ASUS.com/support/download/item.aspx?ModelName=P4P800S-X&Type=BIOS

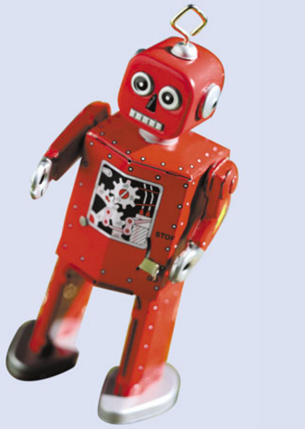
Compiled by Steve Smith

CLASSIFIEDS

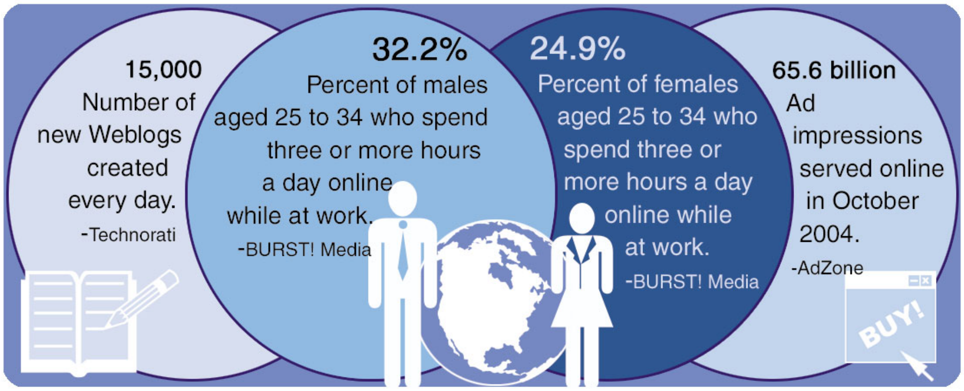
THE Job SEARCH

Robotic Navigator
iRobot

You can be a robot master. One of the leading automaton design firms, iRobot, needs a high-level thinker about robotic navigation, mapping, and vision technologies. You will need a Ph.D. and advanced programming skills in the field in order to run a research team, deliver papers at professional conferences, and "all that scientist kind of stuff," according to the iRobot job description. The Massachusetts company designs the Roomba home vacuum but also provides the U.S. military with mission-critical robots that safely scout for enemies and traps in areas where people can't or shouldn't go.



RAW DATA



15,000
Number of new Weblogs created every day.
-Technorati

32.2%
Percent of males aged 25 to 34 who spend three or more hours a day online while at work.
-BURST! Media

24.9%
Percent of females aged 25 to 34 who spend three or more hours a day online while at work.
-BURST! Media

65.6 billion
Ad impressions served online in October 2004.
-AdZone

Mighty Mozilla Munches Microsoft Monopoly

Pent up frustration with the Internet Explorer browser monopoly, and IE's persistent security holes, are sending millions of users to Mozilla's newly released Firefox. The alternative open-source browser already has a total global usage share of 4.58%. In fact, 7.35% of usage is going to all varieties of Mozilla browsers, up dramatically from 2.1% just last May. Microsoft's massive 88.9% share is down 5% in about six months. Mozilla may not be swallowing Microsoft whole, but clearly it's nipping at the edges. More than 5.6 million people downloaded Firefox in its first two weeks of release, and Mozilla says it is hoping to nab 10% of the browser market in a year.

Our Changing Internet Ways

According to a new Harris poll, American Web usage has evolved substantially in just the past few years, with email usage actually declining as a share of our Internet time, and travel planning and product research up substantially.

Web activity done "often" or "very often"	Dec. 2000	Dec. 2003	Nov. 2004	% Change 2000 to 2004
Send/receive email	74%	67%	66%	-8% ↓
Research (work/school)	37%	45%	46%	+9% ↑
Gather product/ service information	25%	41%	38%	+13% ↑
Surfing new sites	24%	32%	34%	+10% ↑
Make or book travel plans	11%	15%	26%	+15% ↑
Find local activities	11%	19%	22%	+11% ↑
Research health/diseases	13%	15%	21%	+8% ↑

SOURCE: HARRIS INTERACTIVE

Denon's philosophy is simple.

Either you're innovating or you're imitating.

Introducing Denon's New AVR-5805

The World's First 10-channel A/V Receiver With Fully Configurable 4-zone Capabilities

A Breakthrough In Multi-source, Multi-zone Flexibility

For the home entertainment enthusiast and custom installer alike, Denon's new AVR-5805 delivers unprecedented four-zone home entertainment integration and control — all from a single component. With 10 configurable and discrete amplifiers, 16-channels of audio output, and the world's first-ever ability to drive two fully independent 5.1 systems, the AVR-5805 will also route audio and video signals from up to four independent sources and distribute them to up to four separate zones throughout the home. Its advanced capabilities even allow discrete power, source selection and volume control of each zone. And flexibility is just the beginning. Read on.

Masterful Technologies And A "Sweet Spot" For Every Listener

Behind the AVR-5805's newly designed, easy-to-read front panel display is a profusion of powerful technologies. An Equal Power amplifier section delivers a massive 170 watts of high-current power into each of its ten channels, processing for every popular 7.1-, 6.1- and 5.1-channel surround sound format — from Dolby (including Pro Logic IIx) and dts, to THX Ultra2 and THX Surround EX. The AVR-5805 also introduces the latest in Auto Setup Calibration and Equalization with the Audyssey MultEQ$_{XT}$ system, tailoring sound not only to the listening environment but also to the audience. This advanced technology analyzes and calibrates six critical settings including variable crossover point detection. It also determines the correct frequency response for up to six separate listener positions and then averages all six. The result? Literally a "sweet spot" for every listener in the room.

d-tools AMX CERTIFIED CRESTRON Integrated Partner

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Advanced Video Conversion And Denon's Exclusive Circuitry
The AVR-5805 offers a full complement of advanced processing capabilities like HDMI/DVI digital video selection, video up-scaling (including Faroudja DCDi technology for analog sources) and the world's first dual, independent video conversion for unmatched simplicity and the highest picture quality from all your video gear. For even greater A/V performance, it employs the most advanced Texas Instruments' and Analog Devices' 32-bit DSP processors, Burr-Brown 24-bit/192kHz audio DACs, as well as Denon's newly improved DDSC-D (Dynamic Discrete Surround Decoder-Digital). And to top it off, exclusive Advanced AL24 Processing Plus circuitry maximizes all source signals so that the high-resolution DA converters work at peak capacity.

More Connection Options Than Any Receiver In The Industry
In addition to an extensive complement of digital and analog A/V connections, the AVR-5805 includes a full array of "custom installation" features: assignable high amperage DC trigger outputs, dual RS-232C ports to facilitate integrated system and PC connectivity, and a built-in Ethernet port that adds more system control as well as future updates and upgrades. In-demand connection options include 6 high-bandwidth (100 MHz,) HDTV-compatible component video inputs, HD switching for 2 zones and much more. Finally, the latest version of Denon Link 3 and dual IEEE-1394 inputs allow for reception of high-resolution, multi-channel digital audio data directly from compatibly equipped DVD players. It all adds up to total flexibility and the ultimate level of sonic performance. Denon does it again.

DENON
The First Name in Digital Audio

The Saint

by Alex St. John

Mobile Gaming

My company gets asked to develop mobile games a lot. My investors and many others see the huge boom in mobile gaming and the huge multiple the market gave JAMDAT when it went public recently and have concluded that cell phones will be the next great gaming platform. I remain dubious. Although many smartphones these days have enough processor power and memory to match the minimum system requirements for Windows 95 when it was launched ten years ago, unlike the PC, cell phones have very little in the way of hardware standards. Mobile hardware architectures differ so widely that only the most primitive lowest common denominator games can be ported across them.

In theory, Java might be a useful abstraction language for game developers to use to span mobile devices, but mobile Java implementations are relatively slow, consuming a large portion of RAM and CPU cycles for relatively little return. Java support for gaming functionality is also very poor, despite Sun's protestations to the contrary. As such, most mobile game developers write their mobile games in C and manually port them across the most-popular devices mobile carriers support.

Another great challenge to mobile gaming is inconsistent input control. Cell phones don't have standard button layouts or support for analog controls, again severely limiting the types of games that can work across multiple devices. Other major limitations to making great mobile games include a lack of floating point support on mobile CPUs, lack of hardware support for audio mixing, low screen-refresh rates, and lack of graphics acceleration.

If you compare a leading-edge mobile device to a leading-edge Nintendo Game Boy DS, the differences are very interesting. Modern smartphones and PDA's increasingly make use of Intel ARM processors in the 100 to 200MHz range. A 200MHz ARM is roughly equivalent in performance to a 90MHz Pentium. This processor performs all of the UI rendering functions, application computations, runs Java, etc. A Game Boy DS uses two of these processors, one at 67MHz for the primary CPU and another at 33MHz to manage memory. The lower MHz is probably to conserve battery life because in a gaming device, the heavy burden of computation is handed off to more power-efficient specialized processing chips for 2D/3D rendering and audio mixing. Without these specialized chips the device would require a general purpose CPU in the 500MHz to 1GHz range, which would drain the battery very rapidly and require much more RAM to hold the software. It's also interesting to note that Nintendo is clearly running the DS at clock speeds well below its potential, which suggests that it will be easy for them to release much more powerful versions of the DS in the future, when costs on these parts have come down and power savings have improved.

The Game Boy DS also supports a touchscreen, 18-bit color, and 4-way gamepad-style analog controls. It supports 802.11b networking for multiplayer gaming of up to 16 people.

What's educational about looking at the Game Boy DS architecture is that you quickly realize that in many respects the same architecture that is ideal for mobile gaming might actually be better for mobile cell phones than the muddle of architectures they use today. Why? Because the most common functions that the CPU performs on a cell phone would be faster, cheaper, and less power consuming if they were instead handled by special-purpose media chips. At $170 the DS is cheaper than most smartphones even after the carrier discount. To be fair, you would have to add a $50 antennae component to the DS to make it equivalent to a cell phone, and get rid of one of the two 256 X 192 color screens to save around $25; suggesting that Nintendo could make the ultimate gaming smartphone for around $195. It might be bulky, but I suppose kids are lugging around a Game Boy anyway, so it might as well double as a cell phone.

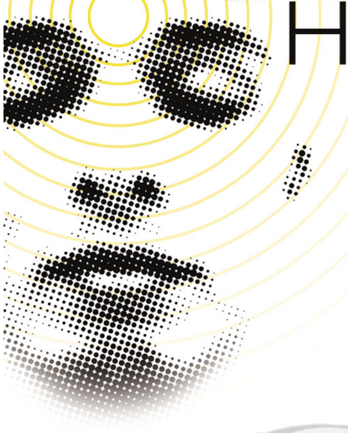
I could get excited about mobile gaming if Sony and Nintendo announced cell phones based on their handheld gaming platforms. Short of that announcement, I think the cell phone companies are still three-plus years away from making phones that are interesting media devices. ▲

Send your feedback to TheSaint@cpumag.com.

Alex St. John was one of the founding creators of Microsoft's DirectX technology. He is the subject of the book "Renegades Of The Empire" about the creation of DirectX and Chromeffects, an early effort by Microsoft to create a multimedia browser. Today Alex is President and CEO of WildTangent Inc., a technology company devoted to delivering CD-ROM quality entertainment content over the Web.

Java support for gaming functionality is also very poor, despite Sun's protestations to the contrary.

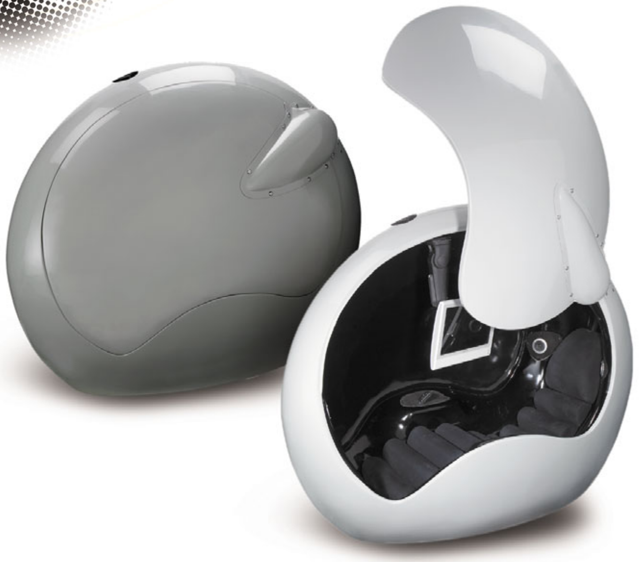
DREAM HARDWARE



These Gizmos Don't Sing It, They Bring It

Few words are so tear-blinkingly beautiful as "escapism." After a winter of landscapes as dreary as our office environs, we're ready to bug out. If we're not out playing super spy in our amphibious jeep, we'll be cocooned in our rejuvenation chamber with the phone off the hook. We'll let our blue Shmoo watch the place while we're gone.

by Marty Sems



The Oculas

"Mork calling Orson. Come in, Orson." For those times when you feel like returning to the, ah, egg, ease into your own personal Oculas. Thinner and more comfortable than Mork from Ork's ovoid spaceship, the Oculas lets you shut out the world and immerse yourself in entertainment. Power up the built-in iMac, angle the LCD touchscreen in front of you, and feel the butt-whompin' subwoofer underlying the 5.1 surround sound. Whether you're meditating or visiting your own virtual island, courtesy of Secondlife.com, the Oculas provides comfortable personal space for it. The $24,900 Oculas will also accompany Arthur Dent, Zaphod Beeblebrox, and the rest of the "Hitchhiker's Guide to the Galaxy" gang when Disney finally brings them to the big screen. (No infinite improbability jokes, please.) Details are light at www.theoculas.com, but there are plenty of class notes from a marketing student. Earth calling Oculas team: less "delivery integration deployment," more cup holders.

Sanyo Roborior

See what happens when we take our eyes off the Japanese robot market for a moment? It gets all Tokyo cutesified. Sanyo's Roborior (about $2,700) resembles a fat owl sleeping with its head under its wing, or perhaps one of those glowing deep-sea jellyfishes in "The Abyss." The Roborior can detect intruders while you're away and then contact you on your 3G FOMA phone to complain about them. (The United States has little to no FOMA coverage, sadly enough). You can then use the Roborior as a remote video camera to get a good look at the interlopers. The site is www.roborior.com, although we suggest letting Google translate everything behind that URL. The site helpfully points out that the Roborior, when not guarding your stuff, doubles as a lamp.

Gibbs Humdinga

Enough with the stereotype of the Hummer H2 owner having a midlife crisis. Like millions of other dads, he's probably always wanted a toy like that; it just took until middle age to be able to afford it. We'd go one better with the Humdinga, a militaristic 4 x 4 edition of Gibbs's Aquada amphibious car (www.aquada.co.uk). On land, it's a 350hp brute capable of 100mph speeds. Push a button and it becomes a 40mph speedboat. The Humdinga is still in the concept stage, so it's too early to price. For perspective, the Aquada now costs less than $150,000, about half of its initial price at launch.

Give Your Megapixels Some Love

Inkjet Printers For Your Photo-Printing Consideration

With digital cameras now outselling film-based cameras, we'll guess that you're shooting in megapixels. (If not, look for our roundup of power user-friendly digicams soon.) Still, you shouldn't keep your great images in pixels forever. Today's photo printers have broadened into a diverse breed suited to everyone from prosumers to party animals. Take a look at our field and see what's right for you.

How We Tested

We used three images (JPEGs at the lowest compression setting) taken with a 5MP Olympus digicam to emulate real-world usage: a landscape shot of a chalet set in snowy, forested hills; a head shot of a child in a Halloween costume; and a black-and-white portrait of women with color used to punctuate the autumn leaves at their feet. We also placed a close-up image of a baby on an SD card for testing direct-printing abilities without a PC. For each, we confirmed the source image exceeded 8 x 10 inches at 300dpi so as to require downscaling by the printer driver to fit the media.

Canon Selphy DS700

Measuring 3.1 inches high x 8.5 inches wide x 8.5 inches deep and weighing 4 pounds, the Selphy DS700 is a great printer for users more interested in printing on the go than producing frame-worthy art. The DS700 is a 4,800dpi inkjet that takes 4 x 6 media. You can connect via USB to a PC or Mac, but we had hit-and-miss results with Canon's software. The Easy-Photo-Print app is handy for quick image selection and basic editing, but the ZoomBrowser app was essentially unusable, as it wouldn't recognize the JPEG photo we wanted to print on our SD card.

The printer's paper carrier tray swings down to reveal a multiformat flash card reader. You also get a USB port for PictBridge printing and an IR receiver for printing directly from a cell phone. We used a 66KB JPEG on our Audiovox smartphone and were dazzled to see the photo streaming out in seconds. Pixelation was obvious, but the point is that it printed at all. There's a composite video output jack so you can use any TV as a preview monitor. The DS700 has onboard options for auto brightness and noise correction and can put date stamps on your prints.

The Selphy shows a noticeable color shift toward red, which faded out greens and blues. Thus, our mountain landscape showed a hint of sunset in the distant trees that didn't really exist. Using the built-in photo optimizer option can help reduce this. Contrast in our baby portrait was far better than average, but some details in our landscape were fainter on the Canon unless we employed the optimizer. Expect about 75 images per color cartridge and know that prints are moisture-resistant.

The DS700 is a sure crowd pleaser when you need immediate, respectable prints on the road, but we wouldn't suggest it for serious archiving.

Epson Stylus Color R800

With a 5,760 x 1,440 resolution and an unbelievably small 1.5-picoliter droplet size, the R800's accuracy is astounding. That's thanks in part to its use of seven colors: cyan, magenta, yellow, matte black, photo black, red, and blue. This printer revealed detail in our images that we could not even see when zooming in on a monitor. For example, we could see the texture in a flat layer of snow. Whatever grain was present in images was purely the result of source file compression. We brought up some 55MB images scanned at 4,000dpi

Selphy DS700
$199.99
Canon
consumer.usa.canon.com

Photo printers

Printer	Technology	All-in-one	Resolution	Vendor-rated speed (top quality)	
				Black	Color
Canon Selphy DS700	Inkjet	No	4,800 x 1,200	N/A	**85 seconds
Epson Stylus Color RS800	Inkjet	No	5,760 x 1,440	17ppm	**45 seconds (5 x 7)
* HP Photosmart 375	Inkjet	No	4,800 x 1,200	N/A	**100 seconds
HP PSC Photosmart 2710	Inkjet	Yes	4,800 x 1,200	30ppm	20ppm
Lexmark P6250	Inkjet	Yes	4,800 x 1,200	22ppm	15ppm
Olympus P-10	Dye-sub	No	310dpi	N/A	**Less than 45 seconds
Polaroid PP46d	Dye-sub	No	300dpi	N/A	**90 seconds, plus processing

* To read this review, go to www.cpumag.com/cpumar05/inkjets. **First page out

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

from top-grade ISO 100 Fujifilm negatives and found the print quality flawless. Contrast on the R800 pops without being heavy-handed, and colors come through brilliantly without perceptible shifting.

Epson supports Print Image Matching, plus extensive color correction tools within the drivers. You can control gamma, saturation, edge smoothing, canvas texture, and levels for cyan, magenta, and yellow. There are also four Windows ICM (image color management) profiles. Epson also adds a Gloss Optimizer cartridge. This transparent overlay corrects for the bronze tone that other printers exhibit when using pigment-based inks. Similarly, black-and-white prints looked awesome—a hard trick for consumer photo printers to do well. This depth of color reproduction granularity is why most prosumers turn to Epson.

The R800's one drawback is that Epson dispensed with direct-printing capabilities via USB and flash card. (But would you really waste all this power on a snapshot that hasn't been through a photo editor?) Conversely, the R800 accommodates 4-inch and 8.3-inch roll paper, although there's no roll cutter built in. There's also a special tray for direct printing onto compatible CD/DVD media. Our tests on CD printing looked decidedly grainy, but the color remained good, and Epson's labeling application was fairly intuitive.

The R800 is another Epson model that uses UltraChrome pigment inks. These are rated at up to 100 years of colorfastness on Epson glossy and matte papers. We tried printing on several media types that Epson sent us (glossy, matte, semigloss, and scrapbook stock) and were consistently dazzled.

The R800 features USB and FireWire inputs. The package comes with a full complement of inks but no paper media, so stock up. This is the printer we would trust with our treasured family heirloom photos and images destined for framing. For casual printing, the R800 is overkill.

HP PSC Photosmart 2710 All-In-One

The 2710 surprised us like a 2 x 4 swinging out of the shadows; it actually did a better job than Epson of staying true to color tones in our mountain landscape. Epson's output was more accurate on our portraits, but we have to concede that at arm's length, HP's color results looked better and brighter. Under a magnifying glass, we saw that Epson's level of detail clarity remains superior, but, man, it's a close call.

However, the 2710's output isn't of archival duration, as there were smudges under moisture and a slight amount of the embossing effect on dark lines that bugged us with HP's Photosmart 325. We didn't observe this on HP's glossy brochure media, however. We also weren't crazy about having to swap black and photo color cartridges.

You don't get direct-to-disc label printing, but HP delivers a full flash card and USB (PictBridge) panel. The printer builds in 802.11b/g and 10/100 Ethernet networking, plus you can add Bluetooth compatibility. And don't forget that this is still a PC-independent fax machine, copier, and 2,400 x 4,800 scanner. HP also does a first-class job with its LCD screen and the printing and editing menus behind it. The

Stylus Color R800
$399
Epson
www.epson.com

CPU CPU CPU CPU C

PSC Photosmart 2710 All-In-One
$399
HP
www.hp.com

CPU CPU CPU CPU

P6250
$199
Lexmark
www.lexmark.com

CPU CPU CPU C

8 x 10 Landscape (top quality)		4 x 6 Portrait (top quality)				
Startup	Time (minutes:seconds)	Startup	Time	SD card 4 x 6	Borderless	LCD
N/A	N/A	4 seconds	1:28	1:41	Yes	No
14 seconds	4:16	28 seconds	2:35	N/A	Yes	No
N/A	N/A	8 seconds	1:42	1:40	Yes	1.5 inch
4 seconds	6:34	4 seconds	3:03	2:08	Yes	3.5 inch
13 seconds	2:50	8 seconds	1:20	2:59	Yes	2.5 inch
N/A	N/A	13 seconds	0:58	N/A	Yes	No
N/A	N/A	31 seconds	2:19	2:07	Yes	1.5 inch

CPU Ranking: 0 = Absolutely Worthless CPU CPU C 2.5 = Absolutely Average CPU CPU CPU CPU CPU 5 = Absolutely Perfect

SmartFocus feature in particular does commendable work at sharpening fuzzy images.

The 2710 may be the second-best photo printer in this roundup, but it's definitely the best overall value.

Lexmark P6250

If you're new to photo printing and want generally good output with plenty of usability features, this is your unit. The P6250 is an all-in-one borderless-photo printer/scanner/fax/copier with an 8.5 x 11.7 inch flatbed and a stylishly low profile. It took forever to install, but Lexmark's software is easy and comprehensive, and the printer's bright, full-color LCD screen offers everything from estimated time to print completion (not always accurate, though) to a video on how to swap cartridges.

Forget Lexmark's bundled Imaging Studio software for printing. Lexmark's software and Jasc's Paint Shop Pro Studio have identical startup times and image quality, but Imaging Studio crammed our test image against the left border and we couldn't find an option in the software for centering. In addition, PSP printed the image in 2:50 (minutes:seconds), while Lexmark's software droned on for 5:37.

The P6250 has one key shortcoming: It doesn't ship with a black cartridge. Instead, you get a cyan/magenta/yellow cartridge for regular printing and a cyan/magenta/black photo cartridge. If you'll be printing a lot of text, a dedicated black cartridge will run you $20 or $25, depending on capacity.

Photo output was surprisingly good. Lexmark leans a bit into the red, but this made for better flesh tones. There's some graininess and faint banding, but you have to peer really close to see it. The P6250 was strangely fickle about reading our SD card, but Lexmark's menus make quick work of resizing, cropping, adjusting brightness, and tagging multiple images for output on a single page. Output speed was about average in this field. The printer is PictBridge-compatible and supports all major flash formats. At $199, this unit doesn't offer stunning must-haves, but it remains a great deal for an entry-level all-in-one.

P-10
$179
Olympus
www.olympusamerica.com

Olympus P-10

As Olympus' ads promise, the P-10 really does output photo lab-quality prints. Not even the R800 managed to pop out some of the details we saw from the P-10, such as the tiny flecks of flash bouncing off of individual strands of fur in the leopard costume. Like HP, Olympus seems to nudge brightness and contrast to make photos more vibrant, but Olympus goes a little too far in the darks. In one of our test images, background shadow detail was almost entirely lost. Still, Olympus nails light and midrange tones.

We also noticed under very close scrutiny that the P-10's edges are sometimes slightly sharper in prints than the original images. Of course, in a 4 x 6 format, no one is likely to notice these tiny, quality-enhancing tricks. Most observers in our office preferred the P-10's output for general photo sharing over all rival models.

One word of caution, though: The demo unit Olympus sent us arrived pre-loaded with an opened pack of media. (Dye-sub ribbons and print media ship and install as one unit.) The first image we printed exhibited two very noticeable dye flaws, and light areas showed some faint bronze overtones. Be careful about leaving your unprinted media exposed to air.

In all other ways, the P-10 clearly exhibits why dye-sub technology remains a favorite of commercial printing kiosks. The P-10 has no LCD window or flash card slots, but it offers a USB PictBridge port and consistently prints in less than one minute. Its small footprint and dynamite output make it a clear winner for those wanting simplicity.

PP46d
$249
Polaroid
www.polaroid.com

Polaroid PP46d

Although the PP46d 's output is decent, Polaroid's driver implementation needs a lot of work. This was the only printer we tested that required manual setup through the Add A Printer routine, not Plug n' Play.

Polaroid's clarity is nearly on par with Olympus, but Polaroid fiddles with brightness in the other direction. The PP46d preserves detail in the darks but often loses it in whites. Our landscape shot was noticeably shifted toward red, which tells us that Polaroid is gunning for warmer skin tones, although this isn't extreme. Polaroid looks downright cool compared to, say, Lexmark.

We really like the unit's small footprint (7.4 x 4 x 9.4), and the inclusion of Adobe Photoshop Album is a good touch. But the list of gripes stretches on from there. The PP46d wouldn't read a flash card while connected via USB, and while there are plenty of layout options in the integrated menus, there are no enhancement tools. The PC driver is so bare that it doesn't even offer the option to fit images to the media. The time to tell someone the paper is out is before you start a print job and walk away. You'll also note that the PP46d takes twice as long as the Olympus to print—a process that includes ejecting and retracting the media for each color pass—and costs $70 more. Flash card slots are great, but where's the PictBridge support to go with them?

Comparisons against HP and Olympus don't favor Polaroid. This is a fair unit, but not one we'd recommend. ▲

by William Van Winkle

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

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Mini-Roundup: NVIDIA nForce4 Ultra Boards

From NVRAID to 10 USB ports to incredible native GbE performance, we could gush on and on about the new nForce4 chipsets . . . but we already did. (See our review in the December 2004 issue of *CPU*; page 16.) Now it's time to test some production samples (but we'll be back soon with a look at boards based on the high-end NF4 SLI chipset). We'll start with the Ultra boards. We're ignoring the standard nForce4 boards for two reasons: 1) We like that the Ultra supports the newer 3Gbps SATA format and uses a predominantly hardware-based firewall approach rather than bogging down the CPU, and 2) We were unable to receive any standard boards in time for this review.

Early reports on overclocking the nForce4 from around the Web have been mixed, but our results would tend to point to a 4000+ chip operating just shy of its ceiling at default settings. At 215MHz, we found the boards unusable. At 210MHz with the voltages pumped up, we saw some variance in strain tolerance between the boards, so that's where we settled for our OC tests.

VNF4 Ultra ZENITH VE

Chaintech ZENITH boards are normally loaded to the gills with extras. Not so this time. Chaintech wanted a bargain approach to the already feature-rich nForce4 Ultra, and that's what it delivers. The company even shaves off some PCB estate, shrinking down to a 305 x 220mm ATX form factor.

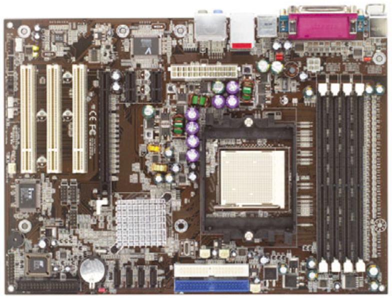
This slimming might enable some slightly smaller systems, but it also makes for some odd feature placement. The four DIMM slots are turned 90 degrees and positioned between the CPU retention module and the board's right edge. No problem here—a lot of SFF designs do this. Our biggest gripe was the position of the 24-wire ATX power connector right behind the audio ports, which awkwardly twists the fat wiring bundle right above the CPU fan.

The board offers a front audio connector, but there isn't an extension for digital audio output. In fact, there's little more in the box than some discs, two SATA cables, and an I/O shield. Chaintech's BIOS covers the essentials for overclocking, but you'd never know it from the manual, which reduces the entire BIOS to three pages.

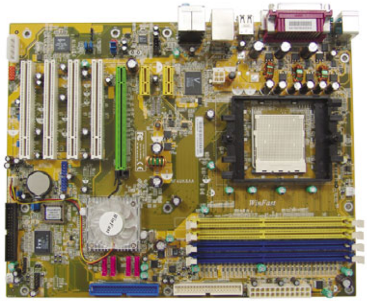
On performance, Chaintech chimes in ahead of where we expected for a budget board. Across the board, the VNF4 Ultra goes toe-to-toe against its rivals at default settings, even taking the lead in PCMark's System test and Half-Life 2. Chaintech also gets high marks because it was the only one of these three boards that completed a Doom 3 run at our overclock settings, although the results still trail Foxconn's default settings score.

We were a little nervous about stability. The VNF4 Ultra was the only board to fail both the System and CPU tests in PCMark while overclocked, and at default settings, we had to run the CPU test three times before we got a usable score. A slower CPU, and perhaps a BIOS update, might very well remedy this.

Overall, Chaintech delivers a board that performs strongly with a couple of niggling stability questions. If you don't care about backplane perks and other extras, the VNF4 Ultra is a great value for the mainstream AMD buyer.



VNF4 Ultra ZENITH VE
$114
Chaintech
www.chaintechusa.com



NF4UK8AA
$110
Foxconn
www.foxconnchannel.com

NF4UK8AA

Stuck squarely between Chaintech and MSI in terms of features and performance, Foxconn's NF4UK8AA doesn't offer any gee-whiz innovation like MSI's DBS. This is simply a well-rounded board with strong default speed test scores and features placed right where you want them. Foxconn is careful to keep lots of empty space and low-profile

VNF4 Ultra ZENITH VE Specs: Slots: 1 x16 PCI-E; 2 x1 PCI-E; 3 PCI; PATA: 2; SATA: 4; Fan headers: 4 3x1; Audio: Realtek ALC850; 6 1/8-inch analog jacks; LAN, NVIDIA GbE only

NF4UK8AA Specs: Slots: 1 x16 PCI-E; 2 x1 PCI-E; 4 PCI; PATA: 2; SATA: 4; Fan headers: 3 3x1; Audio: Realtek ALC850; 6 1/8-inch analog jacks; LAN, NVIDIA GbE only

K8N Neo4 Platinum Specs: Slots: 1 x16 PCI-E; 1 x4 PCI-E; 2 x1 PCI-E; 4 PCI; PATA: 2; SATA: 8; Fan headers: 4 3x1; Audio: Realtek ALC850; 6 1/8-inch analog jacks; coax and optical SPDIF; LAN, Marvell PCI and PCI-E GbE

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

capacitors around the CPU socket, for example, although the company trades one 3x1 fan power connector for a 4-wire Molex auxiliary power connector.

Like Chaintech, we had some stability concerns with Foxconn. This was the only board to exhibit a crash in 3DMark05. Although the board did complete the OCed System test in PCMark, we thudded into a BSOD once while exiting Steam after our Half-Life 2 test. We should point out that as of this writing, the NF4UK8AA has yet to appear on Foxconn's site, so there may be newer firmware by the time you see it.

K8N Neo4 Platinum
$155
MSI
www.msicomputer.com

As of now, Foxconn sticks to NVIDIA's GbE controller and adds coaxial SPDIF but not optical. The only RAID present comes built-in from NVIDIA. The board steps down to five 1/8-inch audio jacks instead of six, but you do get one 6-wire 1394a port on the backplane plus a header onboard, and there are two USB 2.0 headers, enabling up to eight ports.

The overclocking features here are primarily confined to FSB, HT, and basic memory timing adjustments. In particular, the voltages cannot be adjusted, which will seriously impact the board's potential—not that Foxconn makes a habit of targeting gamers. Typical of Foxconn, the strength is in the default settings, as evidenced by the Doom 3 score. If overclocking isn't your bag, then you'll likely find the NF4UK8AA a fast, affordable board free from features that might go unused.

K8N Neo4 Platinum

See that x4 PCI Express slot close to the CPU? In a move that may vex NVIDIA, MSI devised a way to imitate SLI by way of software drivers. You just slip one SLI-compatible card in the x16 slot, another in the x4 slot, and link them via their top connectors. MSI calls this approach DBS (Dual Bridge System). Unfortunately, we weren't expecting any SLI testing until next month, so we didn't have the equipment on hand to put DBS through its paces. However, MSI states that DBS performs 5 or 6% below SLI at a substantial cost savings. The company also says that its in-house testing showed a 3DMark05 score of 4907 with one 6800 GT card but with two running in DBS, the score went up 75% to 8592. We'll be interested to confirm this.

DBS is the big news for this board. The other notable addition is Silicon Image's Si3114 controller, which opens up a second set of four SATA ports for RAID 0, 1, and 0+1. (Software supports RAID 5 and 10.) Paired with the NVRAID already spanning the two PATA and initial four SATA connectors, the ability to run 12 drives should satisfy almost anyone.

MSI's parts bundle is surprisingly subdued: a backplane extension with two USB ports, two SATA cables with a single Molex to two SATA power adapters, and rounded IDE and floppy cables. The board's only omission is 1394b support, but MSI makes amends with both coaxial and optical SPDIF ports on the backplane, as well as a 6-wire 1394a port and dual Marvell LAN (one PCI, one PCI-E). But, we do wish MSI would have kept the NVIDIA LAN.

At first glance, our test numbers seem to indicate that the K8N Neo4 slouches on gaming. It does snag last place in both Doom 3 and Half-Life 2, but the other scores are more or less even with its competitors. MSI steals the show in its tweakable BIOS, which is nearly as granular as ATI's Radeon Xpress 200, especially in memory timings. (Note that our board came with a 2T timing default, which was giving us inordinately low results until we switched to 1T.) MSI plays it smart by highlighting potentially unstable voltages for the less OC savvy, and for those who want quick and easy overclocking, there are still the many levels of MSI's overclocking via the CoreCell chip. The higher settings generally prove less stable than manual overclocking, which makes for nearly as much trial and error work in the end.

If DBS actually delivers as promised, the K8N Neo4 deserves to be a breakaway hit for MSI. The board is heavy on features and competitive on performance ▲

by William Van Winkle

nForce4 Ultra Boards

			3DMark05 v1.1.0	Doom 3	Half-Life 2	PCMark 2004 v1.2.0				WM Encoder 9	WinAce
Vendor	Model	Bus Speed	1,024 x 768 x 32	demo1 8x6 ultra	1,024 x 768; custom demo file	System	CPU	Memory	HDD	165MB AVI at DVD and CD VBR	200MB folder
Chaintech	VNF4 Ultra	200	4574	109.3	77.46	4911	4538	5621	4824	3:24	1:41
		210	4607	112.6	77.71	failed	failed	5896	4842	3:15	1:37
Foxconn	NF4UK8AA	200	4583	113.1	75.42	4884	4566	5682	4919	3:24	1:44
		210	crashed	crashed	76.38	5089	failed	5916	4673	3:15	1:37
MSI	K8N Neo4	200	4603	106.6	74.2	4867	4536	5622	4855	3:25	1:41
		210	4600	crashed	75.75	crashed	4735	5873	4836	3:14	1:38

Test bed: AMD Athlon 64 4000+, 1GB Corsair TwinX-3200XL 2-2-2-5, NVIDIA reference 6800 GT, Maxtor DiamondMax Plus 9 200GB SATA, WinXP SP2

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

Head Into Battle With X800 XL

X800 XL
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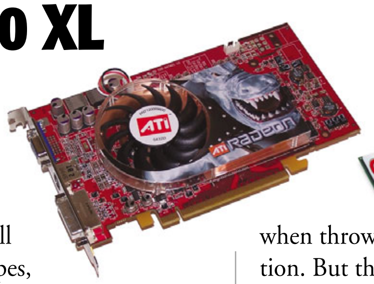
ATI
(905) 882-2600
www.ati.com



It's been a tough battle for ATI with the eight-pipe Radeon X800 Pro vs. NVIDIA's 6800 GT, and to keep up the pace, something had to be done. Enter the new X800 XL armed with a 0.11-micron processor to keep costs down and a detuned X850 core (dubbed the R430). Dropping down from 0.13-micron to 0.11-micron, from the X800 Pro to the X800 XL, is no mean feat but certainly useful for production costs. You can get more chips per silicon wafer, which is why ATI can achieve the aggressive $299 price-point. The drawback of utilizing TSMC's 0.11-micron process is that it's targeted at the mainstream, so there are no fancy low-K dialectic extras.

The only things that are detuned are the core clock speed, which is set to 400MHz (as opposed to the X850's 520 to 540MHz), and the memory speed at 1GHz (down a little from X850's 1.08 to 1.18GHz). The meat, however, is still the same with 16 pipes, 256MB of memory, and dual DVI capabilities. The 32GBps worth of memory bandwidth stacks up well against the GeForce 6600's 22.4GBps. More good news, on paper at least, is fill rate comparisons showing 6400MTexels/s (Mega Texels per second) for the X800 XL vs. 5600MTps and 4000MTps for the 6800 GT and 6600GT cards. This obviously goes out the window with SLI.

The board looks familiar in ATI's red-colored PCB, and the heatsink and fan combo has been directly carried over from the X800 Pro. The PCI-Express X800 XL doesn't require any external power and, when thrown in a system, is a quiet solution. But the really impressive part has to be the actual performance at this price level. NVIDIA now needs to retaliate as the 6800 GT gets into a good punch-up at the hands of the X800 XL. In fact, Doom 3 aside, the tale of the tape shows the X800 XL in the lead. ▲

by Alex "Sharky" Ross

The Numbers

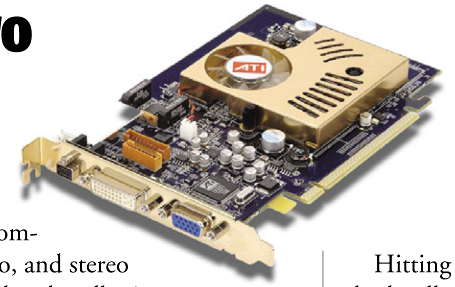
	X800 XL	6800 GT
Half-Life 2	98	83
Doom 3	53	67
Far Cry	56	61
UT2004	70	67

Running at 1,600 x 1,200

Specs: 0.11-micron, 400MHz eCore, 256MB GDDR3 memory

All-In-Wonder X600 Pro

All-In-Wonder X600 Pro
$249
ATI
(905) 882-2600
www.ati.com



It's time for a little expectation management. After announcing the AGP 8X-based All-In-Wonder X800 XT, and subsequently failing to deliver it for several months, you might be disappointed that ATI's first PCI Express x16 multimedia card centers on a 2-year-old 3D architecture with four-pixel pipelines and barely enough horsepower to limp around Doom 3 at 800 x 600. However, if you instead focus on the All-In-Wonder X600 Pro's other strengths, it doesn't seem so bad.

Take connectivity, for example. This is the first All-In-Wonder product to incorporate independent DVI and VGA outputs for true multimonitor support. Of course, that doesn't leave much room on the PCI-E back panel for other I/O, so ATI designed its own dongle interface to accept cable/antenna input, FM radio input, and a pair of redesigned breakout boxes. Each offers S-Video, composite video, and stereo audio; one box handles input and the other provides output.

The card's gaming outlook isn't quite as rosy. ATI's X600 graphics processor is based on the same design that propelled its Radeon 9600 Pro to mainstream infamy. Manufactured on a 130nm process, the core runs at 400MHz and is accompanied by 256MB of standard DDR memory effectively operating at 600MHz. The resulting performance isn't pretty in last year's most demanding shooters, which are pretty much limited to 800 x 600 without anti-aliasing or anisotropic filtering. Flight simulators and RTS titles are a little more forgiving, fortunately.

Hitting that $250 price point undoubtedly forced ATI to make some compromises with the All-In-Wonder X600 Pro's feature set. For example, instead of bundling the popular Remote Wonder RF transmitter, ATI includes a coupon for a 50% discount on the device. Also, component-video output seems to have disappeared from the All-In-Wonder's specification sheet.

Nevertheless, if you're building a home theater PC using a PCI-E platform, ATI's All-In-Wonder X600 Pro is currently your only choice; unless of course you supplement a more powerful graphics card with a separate TV tuner. We're holding our breath for a beefier All-In-Wonder card, though. ▲

by Chris Angelini

Specs: PCI-E x16, X600 GPU, 256MB DDR RAM, TV tuning, FM tuning, composite in/out, S-video in/out, DVI out, and VGA out

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

Total BitHead Mobile Amplifier

Total BitHead Headphone Amp
$269
HeadRoom
(800) 828-8184
www.headphone.com
CPU CPU CPU CPU

If you purport to be an audio enthusiast and suffer with your notebook's integrated sound system, HeadRoom's Total BitHead is a welcome breath of fresh air. It plugs into an available USB port, bypassing your built-in sound card at all times. Then, when you power it up, four AAA batteries kick in, amplifying the signal to better handle the load imposed by quality headphones.

The Total BitHead features two headphone outputs, high-end capacitors, similarly exquisite resistors, and an enthusiast-class Burr-Brown DAC. If you'd like to keep the external sound card capability and sacrifice some aural quality, HeadRoom's standard BitHead will still offer a substantial upgrade from anything you've ever heard from your notebook's line-output for $199. ▲

Specs: Battery-powered (four AAA) headphone amp, external USB sound card capabilities, Burr-Brown PCM2902E DAC

by Chris Angelini

D-Link DCS-3220G Internet Camera

DCS-3220G Internet Camera
$379
D-Link
(800) 326-1688
www.dlink.com
CPU CPU

The D-Link DCS-3220G is an 802.11g device that you can put anywhere and broadcast streaming audio and video back to your PC. But, it's not that easy to run.

Initial configuration is a breeze thanks to a customized setup routine. And, getting a positive feed with great picture quality is easy with a hardwired Ethernet cable. But the only way we got the wireless function to work was when we disabled the security features of our D-Link DGL-4300. Sacrificing network security sounds like a bum trade-off, and if you want audio, you need a 1/8-inch plug.

D-Link has the right idea; it just needs to polish the product a bit. ▲

Specs: 802.11g wireless Internet camera, 2-way audio and built-in motion detection with email notification, 4X digital zoom

by Chris Angelini

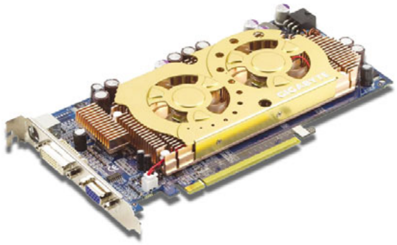
GIGABYTE 3D1 GeForce 6600 GT SLI

3D1 GeForce 6600 GT SLI
$550; with K8NXP-SLI
GIGABYTE
(626) 854-9338
www.giga-byte.com
CPU CPU CPU

If innovation alone garnered awards, GIGABYTE's 3D1 would be one of the year's most popular products. After all, it's the first card to combine two graphics processors cooperating through NVIDIA's SLI technology to improve rendering performance. Unfortunately, the 3D1 comes up a little short in comparison to alternative products, especially at its elevated price point.

For clarification, the $550 asking price also includes GIGABYTE's K8NXP-SLI. Although the entire package actually turns out to be cheaper than buying a motherboard and two GeForce 6600 GT cards separately, you'll have to make a couple of other compromises that diminish its initial appeal.

To begin, the 3D1 uses all 16 lanes of its PCI Express slot precluding the use of another card, if only for expanded multi-monitor support, in GIGABYTE's SLI motherboard. Moreover, when the 3D1 is running in SLI mode, only one display output is usable, as with any other SLI setup. Finally, coupling the two 6600 GT processors in SLI mode disables thermal monitoring capabilities, for some reason, with NVIDIA's current driver package.



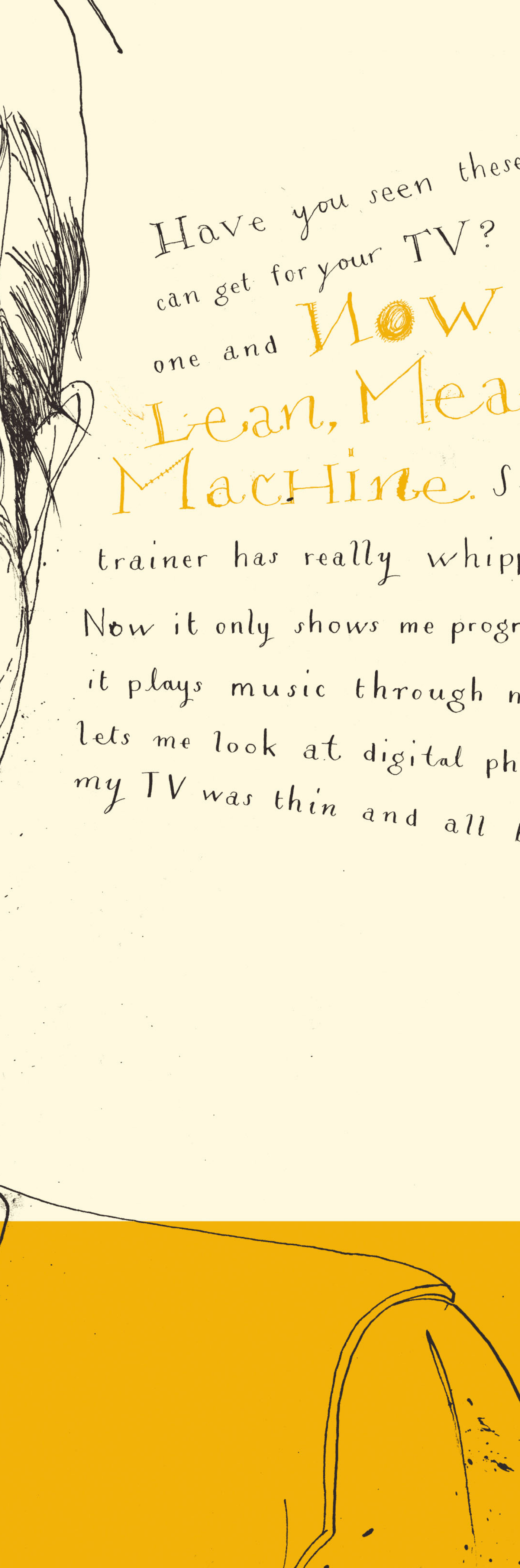
If there's one characteristic that can overshadow such minor shortcomings, it's performance. If the 3D1 had bolstered benchmark scores beyond a single 6800 GT by virtue of its efficient design, perhaps the story would be a bit different. However, the 3D1 doesn't, in fact, outperform a GeForce 6800 GT in most cases and, consequentially, doesn't offer much more than an undeniable "cool" factor.

Representatives at GIGABYTE claim there are other single-card SLI designs in the works, suggesting more advanced products with 6800 GT and 6800 Ultra processors. Although the 3D1 is certainly an interesting and thoughtful concept, it's those higher-end boards that we'd like to see. In real-world tests, the 3D1 simply isn't capable of outperforming even a single GeForce 6800 GT. When you consider the comparable prices of both configurations, we'd rather cruise around on an nForce4 Ultra board with that 6800 GT. ▲

Specs: Dual GeForce 6600 GT GPUs, 256MB GDDR3 memory, dual 128-bit memory pathways, DVO output, VGA output, 500MHz core, 560MHz memory, single-slot design

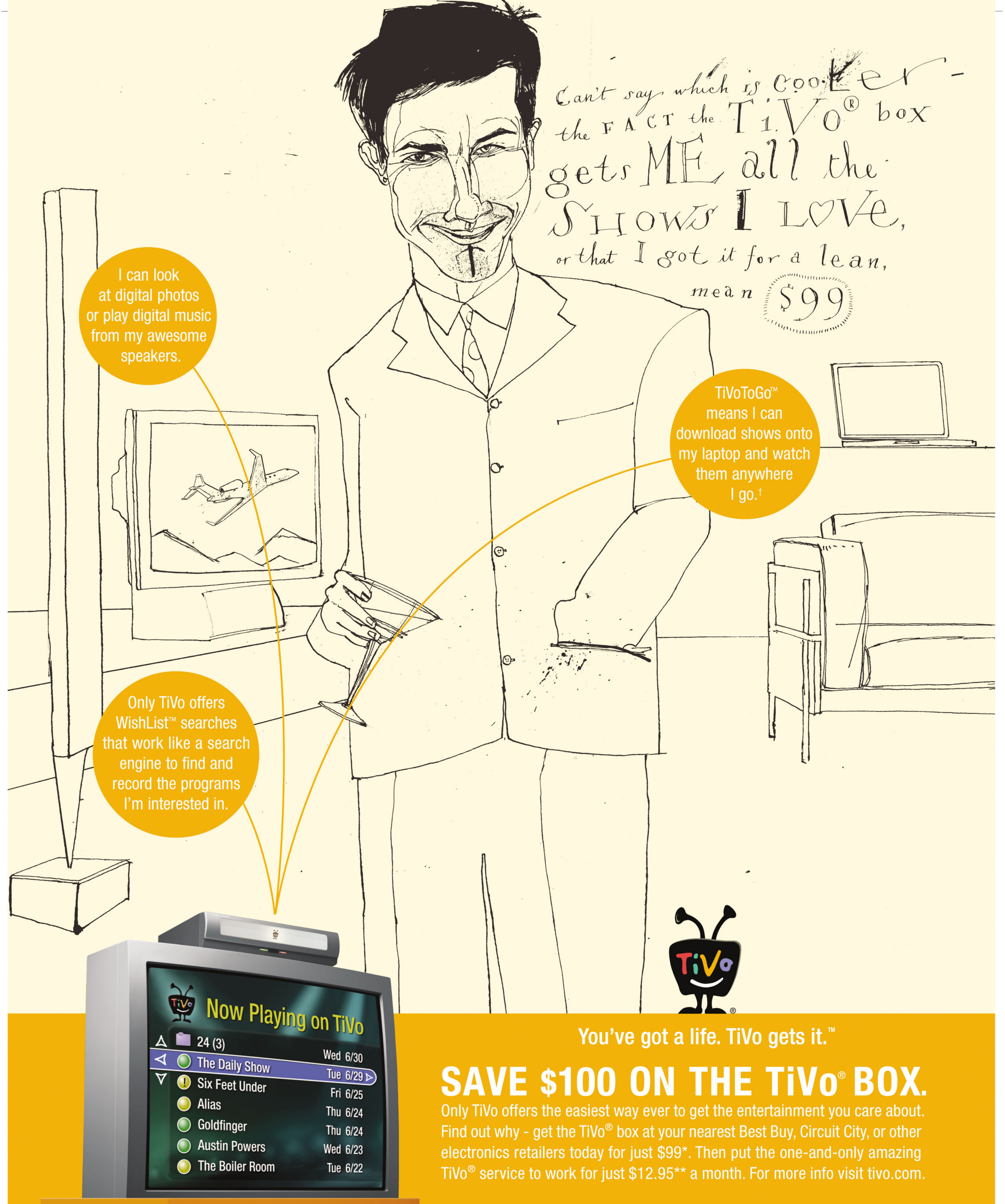
by Chris Angelini

CPU Ranking: ☐ 0 = Absolutely Worthless CPU CPU C 2.5 = Absolutely Average CPU CPU CPU CPU CPU 5 = Absolutely Perfect



Have you seen these personal trainers you can get for your TV? They're awesome. I got one and NOW MY TV is a Lean, Mean Entertainment Machine. Seriously, this little high-tech trainer has really whipped my television into shape. Now it only shows me programs about stuff I like, plus it plays music through my entertainment system and lets me look at digital photos huge onscreen. I mean, my TV was thin and all before, but now it's buff, too.

You've got a life. TiVo gets it.™



I can look at digital photos or play digital music from my awesome speakers.

TiVoToGo™ means I can download shows onto my laptop and watch them anywhere I go.†

Only TiVo offers WishList™ searches that work like a search engine to find and record the programs I'm interested in.

You've got a life. TiVo gets it.™

SAVE $100 ON THE TiVo® BOX.

Only TiVo offers the easiest way ever to get the entertainment you care about. Find out why - get the TiVo® box at your nearest Best Buy, Circuit City, or other electronics retailers today for just $99*. Then put the one-and-only amazing TiVo® service to work for just $12.95** a month. For more info visit tivo.com.

*MSRP of 40-hr TiVo DVR after $100 mail-in rebate. DIRECTV products ineligible. Offer valid from 10/1/04-11/15/04. Actual recording capacity may vary. **Subscription to TiVo service required and sold separately; pricing, terms and conditions subject to change without notice. Access to phone jack required. †When available. See tivo.com for info, terms and conditions. © 2004 TiVo Inc. TiVo and TiVo logo are registered trademarks of TiVo Inc. Season Pass, WishList and TiVoToGo are trademarks of TiVo Inc.

A Tale Of Two SFF Innovations:

Biostar vs. Foxconn

These days most "advances" in SFF boxes seem to focus on chipset updates or fascia cosmetics. We found two exceptions in Biostar and Foxconn. The first is a bold leap forward, the other a curious revamp of the Socket 478 generation that is nearly retro.

iDEQ 300G MCE-I

Our 300G, based on Intel's 915G and ICH6R chipset, is an early sample with a few holes left to fill in. The final release in February will feature a 300W PSU and a full-blown VFT fascia display with readouts for everything from the integrated AM/FM tuner to Biostar's forthcoming media center software. (This will actually reside on a flash card that plugs into a riser in one card slot.)

iDEQ 300G MCE-I
$499
Biostar
www.biostar.com.tw

The 300G is based on the picoBTX form factor, so airflow moves laterally courtesy of two moderately quiet fans. A panel on the system's bottom hides a mini-PCI socket for a wireless NIC. The most notable renovation is the hinge in the top of the frame. Pop the twin latches on the case's bottom and the entire front face and drive cage apparatus swing up, which is great for component installation. A similar forehead-slapper is Biostar's Socket T heatsink retention clip. By using a preinstalled retention module, the iDEQ's copper heatsink snaps in with a single flip-down of a lever, just like the LGA775 socket. Both of the 3.5-inch drive cages slide out, but the hinge design makes access so easy that there's no need to remove them.

Biostar, however, did slip up. There are no extra power connectors for a high-end PCI Express graphics card. Hopefully, the final PSU design will remedy this. We confirmed that the x16 slot worked with an ATI X300 card and only tested performance with the integrated GMA 900 graphics. The 300G tends to outperform most 915G boards we've seen on overall system benchmarks, although memory performance lags slightly.

Despite the slipup, Biostar includes an FM antenna and a media center IR remote control, and a 7-in-1 card reader nestles along the left side of the fascia. The front-mounted player controls are handy, but we're not overly fond of the styling. You get everything here: Matrix RAID, C-Media 8.1 audio, optical SPDIF, and even external SATA out the back. Long anticipated, the iDEQ 300G is everything we'd hoped for and much more.

eBot

Foxconn's first SFF, the eBot, is based on SiS's 661FX/963 chipset, a knock-off of Intel's last-generation Springdale. Although not terribly exciting, this still presents a good way to recycle old components. So we grabbed a 3GHz Northwood, 512MB of Kingston DDR400 ValueRAM sticks and a 40GB Maxtor drive.

Foxconn's panache for chassis design is all over the eBot. A sliding lever unlocks the side panel. Squeeze the two plastic prongs and out pops the swinging retention panel that secures the AGP and PCI backplane cards. If you unplug all of Foxconn's carefully managed cabling, the motherboard tray slides out. The cooler designer with heatpipes strongly resembles Shuttle's ICE. But, something different we liked is the handle built into the top. Also, the way the 3.5-inch drive bay pops out of the case's bottom is ingenious, and the stealthy flash card reader and USB/1394/audio panels along with the integrated slimline DVD/CD-RW combo drive give the whole thing a fairly sleek Everyman look.

eBot
$399
Foxconn
www.foxconnchannel.com

There are problem spots, though. The fascia's oval LCD screen is fine for music playback, but other displays are too cutesy. The optical drive door resists staying closed. Like our Biostar unit, there aren't any extra power leads for higher-end AGP cards, and there isn't any SATA support.

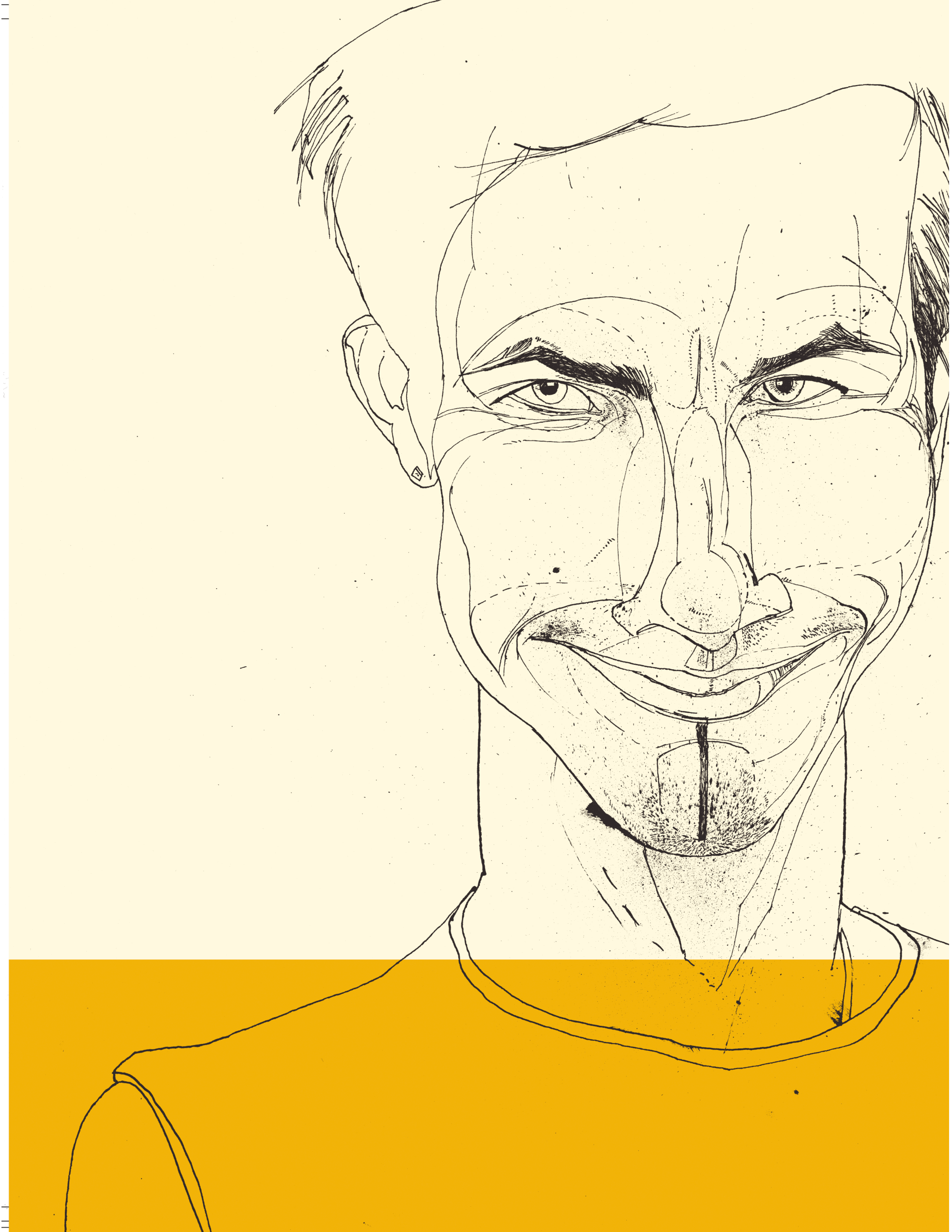
The Prescott-ready eBot pulled in a 3625 in PCMark 2004's System test using integrated graphics, which isn't bad at all, vs. the 4023 we got on our 915G-based Biostar. Clearly, the eBot is designed for desktop use, but there's a lot of unused airspace inside that box, and we suspect more refinement could have made the unit smaller and quieter. Still, Foxconn delivers good value for $375. ▲

by William Van Winkle

iDEQ 300G MCE-I Specs: Chipset: Intel 915G NB and ICH6R SB; RAM: 2GB DDR400; Bays: 2 3.5-inch internal, 1 5.25-inch external; Slots: 1 x16 PCI-E, 1 PCI, 1 mini-PCI; Audio: 7.1 CMI9761A; Ports: 2 1394a, 4 USB 2.0, 1 PCI-E GbE LAN (BCM5751), 7-in-1 card reader, IR receiver, SPDIF in and out

eBot Specs: Chipset: SiS 661FX NB and SiS 963 SB; RAM: 2GB DDR266/333/400; Bays: 1 x 3.5-inch internal; Slots: 1 x AGP 8X, 1 x PCI; Audio: 5.1 AC'97; Ports: 2 x 1394a, 4 x USB 2.0, 1 x 10/100 LAN, 7-in-1 card reader

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect



Audigy 2 ZS Notebook

Sound Blaster Audigy 2 ZS Notebook
$129
Creative Labs
(408) 428-6600
www.soundblaster.com

CPU CPU CPU CPU

When it comes time for audio on the road, fidelity generally takes a backseat to portability. Only recently, with the introduction of Intel's mobile 900-series chipsets, was there incentive for notebook manufacturers to include high-definition sound. Creative Labs is taking a preemptive strike against those second-generation Centrino designs with its Audigy 2 ZS Notebook's CardBus adapter, which leverages the power of Creative's 10K2 DSP for desktop-like features on the go.

From a specification perspective, the Audigy 2 ZS Notebook can do just about anything you'd expect from a PCI add-in board, minus a handful of connectivity options. With that said, the tiny card is capable of powering an eight-channel array of speakers, outputting a digital signal through an onboard optical port, and accepting an optical input. One of the optical plugs doubles as a headphone jack.

If your notebook has a DVD drive (as most of them do these days), the THX-certified Audigy 2 ZS Notebook will decode either Dolby Digital or DTS-ES audio when you're watching movies. Or, you can use it to play back DVD audio at crystal-clear 24-bit/192KHz quality. Providing the rest of your notebook is up to the task of fast-paced gaming, Creative's mobile offering also accelerates EAX 4.0 titles, yielding impressive positional audio, especially with headphones.

So how does it sound? Using a pair of Sennheiser HD600 headphones and a HeadRoom Total BitHead amplifier, it was just about impossible to tell the ZS Notebook apart from Creative's Audigy 2 ZS Platinum while playing back CD Audio. DVD audio, on the other hand, may have been too much for my laptop's little 1GHz Pentium III because it was peppered with clicks and pops. Movies, oddly enough, did not demonstrate the same erratic behavior.

Priced at $129, the Audigy 2 ZS Notebook isn't prohibitively expensive considering its feature set. The only real caveat is that the card will override your laptop's integrated audio controller, and in turn, disable its built-in speakers. Perhaps that's for the best, though. You'll want at least a 2.1-channel configuration or premium headphones to properly audition the Audigy's features. ▲

Specs: Dolby Digital, DTS-ES decoding, 7.1-channel analog output, optical input/output, EAX 4.0 Advanced HD, 24-bit/96KHz input, DVD Audio at 24-bit/192KHz, 104dB SNR, THD at 0.006%

by Chris Angelini

NVIDIA's PureVideo Technology

PureVideo
NVIDIA
(408) 486-2000
www.nvidia.com

CPU CPU CPU CPU

Back when NV40 was launched early last year, the programmable on-chip video processor and its filtering/scaling capabilities, video deblocking logic, integrated TV-encoder, adaptive deinterlacing engine, and HDTV functions got lost in the haze somewhat. Some features were there, though, broken and/or inactive on the 6800s. In addition, reviewers noticed that the Windows Media 9 acceleration was not up to snuff. NVIDIA quickly corrected this problem by relaunching an updated video processor chip on the 6600s, along with some snazzy software, all under the new PureVideo technology moniker.

With a 16-way vector processor for smooth playback, your high-def MPEG-2 hardware acceleration will not only look the part but will have minimal impact on the CPU. The technology also accelerates Microsoft's newer Media Player and Windows XP Media Center's WMV-HD content. An advanced motion-estimation engine lets the user record nonlossy real-time videos. And, if you're into interlaced content (aka cable, dish, and/or DVD), then spatial/temporal adaptive deinterlacing props up the level of detail with fewer jaggies and artifacts. Other neat features include the 3:2 pull-down conversion process and PureVideo's advanced processing techniques, which help restore video to its stock 24fps form. Other features to mention include 4-Tap Horizontal Scaling, 5-Tap Vertical Scaling, and Color Temperature Correction.

You can see where this is going, right? Smack bang in the face of ATI's All-In-Wonder series, which has long been unchallenged. Under the knife, we were surprised to see that not only had NVIDIA finally caught up with ATI in the video processor department, but in some cases, actually nipped ahead of it. For example, not only was the video playback quality slightly crisper, but the GeForce 6600 stressed the processor less than the Radeon X700 (albeit with some beta DLL's put into action). Don't expect ATI to sit still, the company has already readied new and improved drivers. ▲

by Alex "Sharky" Ross

CPU Ranking: 0 = Absolutely Worthless CPU CPU C 2.5 = Absolutely Average CPU CPU CPU CPU CPU 5 = Absolutely Perfect

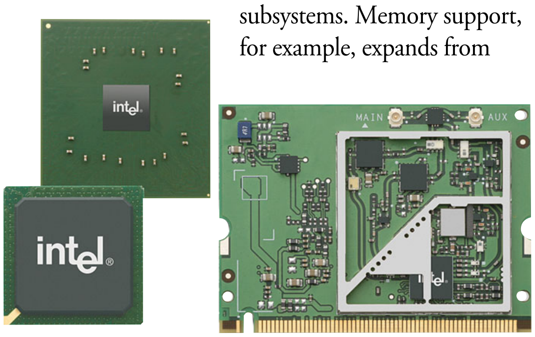
Intel's Sonoma Mobile Platform

It's amazing to think that Centrino generated so much excitement when it emerged two years ago. Comprised of a processor, chipset, and wireless controller, the initiative enabled an entirely new genre of ultra-chic notebook computers boasting extended battery life and respectable muscle. All the while, it employed a processing core rumored to originate from Intel's Pentium III architecture and a chipset that relied on antiquated technology. Granted, Centrino did slowly evolve to include a more-capable CPU and broader wireless support, but that's nothing compared to Intel's brand-new, modernized Centrino, code-named Sonoma.

The whole platform still centers on the same three pillars: processor, chipset, and wireless. However, each is revised to reflect the technologies currently dominating desktop computing, most of which are derived from the latest core logic.

Intel's Pentium M processor is largely unchanged from its past design. The use of 90nm manufacturing allows Intel to cram as many as 140 million transistors onto a die that, according to Intel's documentation, dissipates a mere 21W. And if that wasn't enough, the chip, running around 2GHz and wielding 2MB of L2 cache, is fully capable of trouncing a Pentium 4 or Athlon 64 desktop processor.

Rather than tweak the chip's architecture, Intel accelerated its front side bus to provide more data throughput. The newest models all employ a 533MHz pathway and operate at up to 2.13GHz. They also support the execute-disable bit, which works in conjunction with Microsoft Windows XP Service Pack 2 to help deter certain types of viruses.



Intel's Sonoma Mobile Platform
Intel
(408) 765-8080
www.intel.com

Representatives at Intel suggest that the company's latest mobile chipset is an even more significant development, with specific improvements to several I/O subsystems. Memory support, for example, expands from single-channel DDR333 to dual-channel DDR2-533 (standard DDR is also still an option), AGP 4X makes way for discrete PCI Express x16 graphics, and SATA announces its mobile debut.

No longer will the slimmest Centrino notebooks burden casual gamers with Intel's dismal Extreme Graphics 2 engine, either. The 915GM chipset comes with GMA 900 integrated graphics, an upgraded core that accelerates DirectX 9 games with a hardware pixel-processing engine and a software algorithm that offloads vertex processing. Doom 3 and Half-Life 2 are almost certainly off-limits, but most other titles will at least run, albeit at drastically reduced quality settings.

You'll also see ExpressCard emerge as a new interface enabled by the 900-series chipset. The PCMCIA designed ExpressCard as a replacement for CardBus, leveraging PCI Express and USB 2.0 to facilitate communication between a peripheral and chipset. Centrino notebooks aren't yet shipping with ExpressCard, but the interface will roll out as add-in cards start supporting it. The PCMCIA expects that storage, communication, and multimedia devices will all adapt to work with ExpressCard in the months to come.

Wireless networking is the third and final component of Centrino. Of course, because there's been relatively little development in wireless technology lately, Intel isn't introducing anything particularly innovative. There are two wireless modules qualified for Centrino branding; the first is Intel's own 2200BG, and the second is its 2915ABG. Both work with 802.11b/g networks, while the 2915ABG adds support for 802.11a. Notebook manufacturers who stray from the Intel modules won't be able to use Centrino in their branding; however, alternative network controllers are likely to work just as well.

Although that combination of power-conscious components is designed for notebook operation, Intel's mobile platform is gaining traction amongst discerning gamers, as well. And now that the mobile 900-series chipsets are available, enthusiasts who shunned boards based on Intel's 855GME chipset now have a more modern platform with which to work. Several motherboard manufacturers have already indicated a desire to launch desktop products toward the end of Q1, while others have demonstrated working media center systems powered by this latest incarnation of Intel's mobile technology.

If it's an actual laptop you are after, Sonoma-based systems are already available from several major manufacturers. The first batch employs a lot of mainstream features such as integrated graphics, standard audio, and DDR memory. According to representatives at Dell and ASUS, however, another round of Centrino notebooks will launch shortly with PCI-E x16 discrete graphics, DDR2 memory, SATA hard drives, and larger enclosures. ▲

Specs: Intel mobile 900-series chipset, Pentium M on a 533MHz FSB, 802.11a/b/g wireless networking, ExpressCard support, HD audio, SATA, USB 2.0, Gigabit Ethernet

by Chris Angelini

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

Anand's Corner

Apple's Mac mini

by Anand Lal Shimpi

Anand Lal Shimpi has turned a fledgling personal page on GeoCities.com into one of the world's most visited and trusted PC hardware sites. Anand started his site in 1997 at just 14 years old and has since been featured in USA Today, *CBS' 48 Hours and* Fortune. *His site—www.anandtech.com—receives more than 55 million page views and is read by more than 2 million readers per month.*

Before I started AnandTech, I used to do consulting work—mostly for local college teachers and students. Back then a good computer would set you back $3,000 if you bought it from a store, and home building a system actually saved you money. Yet most folks didn't know how to, so I'd come in, build them a system, and save them a bit of money. The systems ranged from personal computers to office networks, and the consulting business did pretty well. AnandTech saw the end of my little consulting business, but it didn't see the end of me building systems for other people. I'd build systems whenever someone needed a new computer (mostly for friends and family); in fact, in the early days of AnandTech I'd actually build systems for people for free on the condition that I could review the hardware first (no overclocking tests of course).

The issues I had with this little arrangement were twofold: First, I couldn't provide software for free and I had no desire in becoming a tech support hotline. The cost of software became more and more of an issue as the price of PCs dropped because it'd destroy the cost benefits of home building a PC. The second issue is that even if you were able to pick the best in hardware components that would never fail, you still couldn't monitor a user to ensure they weren't downloading or installing something they shouldn't. At first it was a simple issue of making sure a user had a firewall installed, but problems are much harder to prevent when a user knowingly clicks on or downloads something that screws with their PC. After all, "accelerate your downloads for free!" is such a tempting offer to the average computer user.

For years there's been this idea that if they were cheap enough, Macs would be the perfect solution to the aforementioned problem of providing tech support. The idea is that the Mac OS is so simple to use, that it'd be perfect for your friends and family for whom you don't want to provide tech support. Maybe it's the fact that Macs came with one-button mice that really furthered the theory, but in my experience with the OS, I'd say that even though there are elements that are simpler than Windows, overall it isn't a very simplified OS. In fact, in my experience with it, I'd say OS X is much more of a power user's OS than a dumbed down OS that anyone could use. However, there is one aspect of the OS that would solve a lot of the tech support problems I mentioned before: The vast majority of spyware isn't made for Mac OS X. In fact, other than a few isolated cases of warez-related viruses, I'm not aware of any such malware that's been made for the platform. Now I'm not interested in debating why, or whether the platform is inherently any more secure than Windows, but the fact of the matter is that it's one way of getting around the support issue. But then there's that issue of price. . . .

Well, the recent release of Apple's Mac mini solves the price issue. The Mac mini is essentially an Apple PowerBook G4, minus the expensive LCD, keyboard, and mouse, and rearranged to fit in a tiny little package priced at $499. It's tough to compare the performance of its 1.25/1.42GHz G4 processors to an x86 equivalent, but I'd say they'd be similar in performance to the low-end stuff you'd find in today's $499 Dells. But what's most important, however, is the performance of those processors in OS X itself, which is more than reasonable for the tasks the Mac mini would be well suited for. The system doesn't come with a keyboard or mouse, so just make sure you throw a normal two-button USB mouse into the package, and you'll be hard pressed to find a casual Windows user that can't master the basics of the system within an hour or two.

The other benefit is it actually looks cool, and it's extremely tiny—smaller than the smallest small form factor PCs and just as capable. Although it's not going to be your next workstation replacement, it's a great way of getting off the tech support hook or even getting to know an alternative OS. ▲

. . . . OS X is much more of a power user's OS . . . .

Talk back to Anand@cpumag.com.

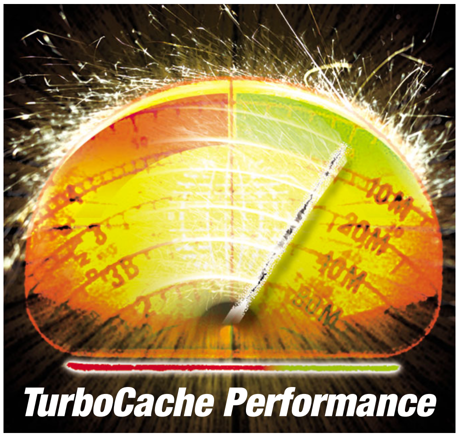
The Shark Tank

TurboCache

by Alex "Sharky" Ross

Having spent the holidays playing Half-Life 2 in 1,600 x 1,200 with 8X AF and 4X AA on dual PCI-Express GeForce 6800 Ultras was fun while it lasted. Let's get back to reality though; nobody in his right mind is going to shell out over $1,000 for that sort of guilty pleasure! OK, maybe some folks as hooked on graphics as I am would, but for the most part that's La-La land. So I've retreated a few steps and gone back to basics—enter NVIDIA's GeForce 6200 with TurboCache.

Late last year, NVIDIA snuck out a couple of cheap, yet very cheerful, additions to its lineup: The $129 6200 with TurboCache, sporting 13.6GBps of memory bandwidth, and the $99 part with 10.8GBps. Although the clock speeds are set at 350MHz (eCore) and 350MHz (memory), thanks to the use of the PCI-E bus, 8GBps of said bandwidth is on tap. The extra coming from 16MB of local memory connected to a single 32-bit channel running at 700MHz. In the $99 part, that would be an extra 2.8GBps worth of bandwidth. The $129 part has an extra 32-bit channel with 16MB of RAM making up the difference. Basically, you get either 96MB or 112MB frame buffer on a board that only has 16MB of 32MB of memory accessed via the PCI-E bus. Instead of needing large amounts of local memory to store render targets, such as back buffers, depth, or stencil buffers, environment mapping textures, or other graphics data, NVIDIA is implementing their TurboCache technique. A clever trick indeed. Although the price of RAM has come down a lot in recent years, it still costs a lot, especially when you're talking about 128 to 256MB of high-performance RAM used for graphics cards. So any cost-cutting that can be done is always welcome.

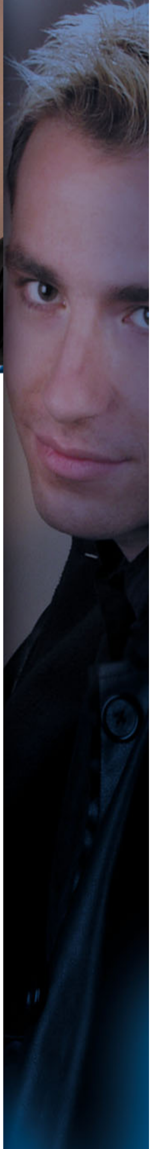

TurboCache Performance

Incorporating TurboCache meant a few necessary pipeline mods had to be made to include a new MMU (memory module unit), allowing boards to seamlessly allocate and deallocate surfaces in system memory and then read and write that memory more efficiently. Other enhancements were made to stifle the associated latency that occurs from system memory access across with the PCI-E interface.

Note that Intel and other 3D chip manufacturers have been doing something similar for years on embedded 3D graphics; it's just that their cores have been so lacking in features, the comparison didn't apply. This is not so with the NV4x architecture used in the 6200s. Trying to play Doom 3 was not a fun experience, but at least it did look good. Half-Life 2 was, however, more than playable at 1,024 x 768 at 50fps. Unreal Tournament 2004 at 1,024 x 768 had frame rates in the 40fps range, which is more than decent. Having a 4-pixel pipeline GPU with three vertex shaders and loaded with the full DX9 class features at the $99 mark at least means you can see everything the game developer intended: it just won't be quick. This is the correct approach, and it's worth noting that only the very complex 3D engines, that tax even mid- and high-range cards, are where the 6200 with TurboCache starts to play as if it's out of its league. Nonetheless, TurboCache makes for an interesting technique should NVIDIA ever see fit to employ it at higher-end levels. It'll certainly save some costs and possibly reduce latency at the same time.

I'm not saying any hardcore gamer or 3D graphics-guzzling addict need apply, but for $99 it doesn't get much better than this. In brief benchmarks, it certainly beat out anything ATI's X300 had to offer. Just think, maybe you could bring one of these cards and sneakily install one on grandma's PC, which has onboard graphics that amount to the same as you eating a jar of leeches. That way when you visit her, you can always stay up late and not let your gaming habit suffer from withdrawal symptoms. ▲

Email me your throw-away, $99 granny-3D cards to sharky@cpumag.com



Disrupting Reuters' newswire with a cheery Christmas greeting at age six, Alex "Sharky" Ross became an avid computer user/abuser, eventually founding popular hardware testing/review Web site SharkyExtreme.com. Exposing shoddy manufacturing practices and rubbish-spouting marketing weasels while championing innovative products, illuminating new technology, and pioneering real-world testing methods was just a front for playing with the best toys. The site acquired, he left in 2001. A London native and London School of Economics graduate, Alex currently overclocks/tunes Porsche 996 Turbos with www.akkuratpgi.com when he's not tweaking PCs.

> . . . for the most part that's La-La land

[H]ard Talk

Upgrading In 2005

by Kyle Bennett

Undoubtedly, 2004 was a boon for hardware enthusiasts who wanted to play games. The AMD Athlon 64 processor came into its own, with the parting of 754-pin parts and 939-pin parts finally becoming widely available in affordable speed bins. Games such as Half-Life 2, Doom 3, and Far Cry allowed us to see all the eye candy our boxes were capable of producing in high resolutions. But what about upgrading in 2005?

While a Socket 754 Athlon 64 (single-channel DDR400) was part of one of the most affordable, high-powered overclocking combinations you could buy last year, it's clear now that the Athlon 64 line of CPUs is dead for Socket 754, as the 754-pin will transition to AMD's budget Sempron CPUs. That said, if you're willing to accept the "dead end," you can still put together some Socket 754 systems for dirt cheap and get great gaming performance. Socket 939, however, is a much different story. AMD is promising that Socket 939 will be around for a good while, and we'll see many CPUs to plug into it. Athlon 64, Athlon FX, and even the yet-to-be branded AMD dual-core CPUs will come in a 939-pin configuration.

In the past couple of months, I've been privy to AMD documentation that clearly shows that not only will dual-core AMD processors have 939-pin and 940-pin configurations, but the current crop of motherboard chipsets that we're seeing come to market now will support them. Although I'm still unsure about Socket 940 support, AMD is communicating to motherboard builders that the implementation of desktop 939-pin, dual-core AMD processors is going to be as easy as dropping the new processor in a current 939-pin motherboard that sports either a VIA or NVIDIA chipset. Yes, you heard that right. No big socket changes. No big chipset rollouts. No big new motherboard specification releases. Just a new dual-core AMD CPU for a current desktop motherboard. Now, of course, we have yet to see any of this work, so we'll see what really happens. All in all though, on the AMD side of things, Socket 939 is here to stay and will be very upgradeable throughout 2005 and it looks like 2006.

For gamers out there, however, AMD admits that they will still be best served with "maximum frequency, single-core solutions until 2006." (Check out my January [page 26] and February [page 32] columns on dual-core CPUs and gaming.)

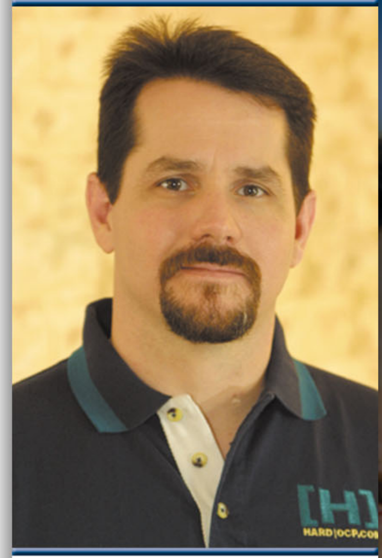
On the Intel side of the fence, we're still seeing companies such as DFI put out i875 chipset motherboards with LGA775 sockets. DFI's 875P-T looks to be a solid motherboard that will let you use your "old" DDR400 and AGP video cards. Looking forward, though, the 925 and 915 series chipset motherboards are here to stay, but be aware that not all i925 chipsets support the new 1066MHz bus speed CPUs. You will need the 925XE to take on the new CPUs. When Intel introduces its dual-core CPUs this year, upgrading will require a new i955X-based motherboard to support the Intel dual-core technology, which will sport DDR2-667 support, as well.

You will see the i955X referred to by Intel's codename "Glenwood," while the first Intel dual-core processors will go by the codename "Smithfield." They'll basically be two Prescott cores on one die. The short story is that Intel is still not the CPU to look to if gaming is a priority. If you're wanting to really utilize your computer in a multitasking environment, Hyper-Threading is still currently king, but it will certainly lose some of its luster when AMD dual core hits and can be dropped into your current gaming box to very likely give you the best of both worlds.

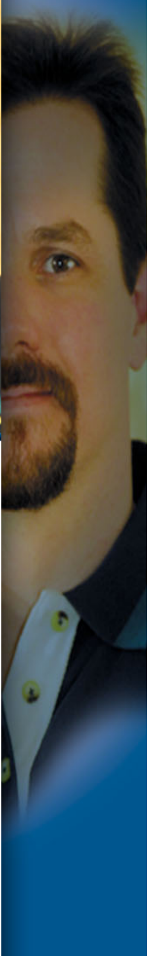
As for video cards, I suggest you definitely move to a PCI Express card, as they are now becoming more readily available and getting down to MSRPs finally. Interestingly enough, at this writing it looks as if VIA will finally unveil its motherboard chipset that supports both AGP and PCI Express x16 video cards. To put it succinctly, this could mean migrating your current AGP video card over to a motherboard that supports PCI-E, and a little birdie tells me that you will be able to use them at the same time.

We can only hope so. ▲

You can talk with Kyle at kyle@cpumag.com.



Kyle Bennett is editor-in-chief of HardOCP.com (hardocp.com), one of the largest and most outspoken PC-enthusiast sites on the Web. HardOCP.com is geared toward users with a passion for PCs and those who want to get cutting-edge performance from their systems. Beware, though, Kyle is known for his strong opinions and stating them in a no-nonsense manner while delivering some of the most in-depth reviews and PC hardware news on the 'Net.



AMD is promising that Socket 939 will be around for a good while. . . .

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PC Modder

Tips & Tutorials

Modding does the body good. A PC's body anyway, inside and out. Here you'll find hardware, firmware, tools, tips, and tutorials for modding your rig's performance and appearance. Send us your own mod-related tips and ideas at modding@cpumag.com.

Modding enthusiasts have a penchant for the latest toys. Fast processors, powerful video cards, silent SFF enclosures, and radically lit motherboards are all fair game when it comes to a modder's creative mind. Recognizing the appeal of unconventional customization, an entire industry has emerged to support the community.

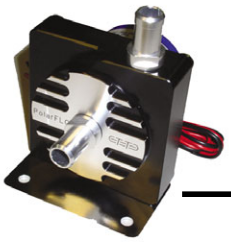
Mods & Ends

PolarFlo TT Series Pump

When we first reviewed PolarFlo's TT Series watercooling kit (November 2004, page 23), we noted that it lacked complementary pump and radiator components. Well, PolarFlo has added those pieces to its processor and graphics waterblock lineup, evening out its catalog somewhat.

The new TT pump uses a Laing D4 motor and rotor, the same one Swiftech's lauded MCP650 uses. The TT's compact design includes numerous mounting options for compact cases. Moreover, you can configure the pump with 3/8-inch or 1/2-inch inside diameter barbs for enhanced flexibility.

At $119, the PolarFlo pump is more expensive than its Swiftech competitor ($79.95). The TT's only advantages look to be interchangeable barbs (the MCP650 is limited to a 1/2-inch ID) and aesthetics. You can order the TT in black or blue. Chrome barbs are $10 extra, as is a chrome housing. Overall, this is a solid product, but a bit overpriced.



PolarFlo's TT pump is super-slim and based on a proven motor.

PC Power & Cooling Turbo-Cool 510 SLI PSU

In addition to its staggering performance benefits, NVIDIA's SLI technology has a couple notable stipulations. To begin, you need a motherboard outfitted with an nForce4 SLI chipset. You also need a pair of graphics cards from the same manufacturer and centering on the same GPU. Finally, you must consider the power demands of two notoriously hungry graphics processors. The Turbo-Cool 510 SLI ($239) is the first PSU to really satiate those requirements with a pair of 6-pin PCI-E connectors built-in.

Delivering power to two PCI Express graphics cards, the 510 SLI is a great choice for discerning enthusiasts.

The 510 SLI has the specifications to back its target audience. The +5V rail is rated for 40A. The +12V rail is good for up to 38A, and the +3.3V maxes out at 30A. PC Power & Cooling makes certain distinctions regarding the performance of its products at different temps. At 77 degrees Fahrenheit, the 510 boasts 600W of output. However, the company says ambient temperatures within PSUs are closer to 104 degrees, putting the unit at 550W. That's more than enough for a beefy SLI machine.

The 510 SLI works with 20- and 24-pin ATX boards and includes two 6-pin PCI-E connectors you'll need for those graphics cards and 15 drive connectors, including six dedicated SATA power plugs. With a 100,000-hour MTBF and five-year warranty, this is a winner.

AeroCool CoolPanel

We've used plenty of cases that didn't come with front-panel connectors or were designed so that they wouldn't work with our motherboards. The CoolPanel ($49) combats this by combining 21 functions into one 5.25-inch bay. You get an 8-in-1 memory card reader, plus the CoolPanel controls two fans; monitors two temperatures with an audible alarm; and offers USB and FireWire connectivity, external SATA connectors, and audio and composite video output. You might run into problems routing the bundled cables in your chassis, but the functionality is worth the effort.

Fashionably Fresh Firmware

PowerShot Pro1 1.0.1.0

This firmware from Canon improves AF speed, zoom ring responsiveness, and changes an AF display spec.

www.canon.com

Apple AirPort Extreme 5.5.1

Firmware 5.5.1 improves hard reset behavior, resolves a PPPoE configuration problem, augments reliability of WDS networks, and more.

www.apple.com

Sony DRU-710/DRX-710UL DVD±R/RW Version BYX2

For Sony DRU-710A DVD writer owners, this firmware boosts DL burn speeds to 4X and DVD-R speeds to 12X.

sony.storagesupport.com

Sony VAIO Pocket Digital Music Player 3.0.0

This update adds MP3 support, gapless playback, skin features, and more.

esupport.sony.com

by Chris Angelini

Modding Techniques

Prevent Mishaps With Preparation, Precaution & Planning

Whether you plan to install a custom window in your case or just mount a fan in a unique location, chances are you'll have to do a little cutting or drilling. These processes may seem straightforward to some, especially the elite case modders amongst you, but with the myriad power tools now available, it's easy for the uninitiated to make easily avoidable mistakes.

Do you use a jigsaw or rotary tool to cut a hole? Would a drill and hole saw be a better choice? Well, it all depends on the situation and the shape of the hole. How exactly do you know which tool or bit is best suited for the job? That choice hinges on a couple of other factors, such as the material and location of the mod you're performing. We'll explain which tools we prefer for some common jobs and which techniques are likely to produce the best results.

The Tools

By far, the most common tool that case modders use is the rotary tool you'll hear commonly referred to as the Dremel. Dremel is only a single brand of rotary tool, though. There are actually a number of other brands also available. No matter which brand you're using, if armed with the right assortment of bits and wheels, you can use a rotary tool for almost any type of physical mod. You can use cutting wheels for precisely cutting plastics and metals and grinding wheels to file down sharp edges and eliminate burrs. In addition, there are numerous types of bits available for drilling, sanding, buffing, etching, and more.

A good rotary tool, such as the ubiquitous Dremel, is perfect for a multitude of different mod-related projects.

Rotary tools are best suited to smaller projects that require dexterity and precision. Accessories, such as Dremel's Flex-Shaft, are especially useful for jobs in cramped quarters and for fine etching or sanding. When equipped with a sharp cutting wheel, a rotary tool also works well for cutting through plastic and aluminum. Unless you have a specialized circular-cutting attachment, however, leave round cuts to a hole saw.

Using an accessory such as Dremel's Flex-Shaft will give you much more control over the bit for precision cutting and grinding in tight spaces.

As its name implies, a hole saw is for cutting holes, and one is usually used in conjunction with power drills. Hole saws

CPU's Top 5 Aesthetic Mods

1. **Custom-built cases.** Building a truly unique and functional custom enclosure is a surefire way to gain elite status in the modding community. You'll see some of the most outrageous custom cases featured on Web sites and in publications globally. Why, you'll even see a few on our pages, such as this month's Puzzlebox PC "Mad Reader Mod" on page 40.
2. **One-of-a-kind custom paint jobs.** There's a reason boutique system builders, such as Falcon Northwest and Voodoo Computers, charge thousands of dollars for a custom painted system. There's simply no better way to differentiate a system that was built using an off-the-shelf enclosure than painting it with high-quality paints, complete with unique air-brushed logos and artwork.
3. **Custom-cooling solutions.** We love any mod that makes a system run cooler and lets you overclock it higher. Systems with custom watercooling, or even well-designed aircooled rigs, can help a system run at lower temperatures, thus increasing its reliability, stability, and overclockability—all things that rank very high on our must-have list.
4. **Custom-case windows.** Anyone can go out and buy a case with a window, but it takes a steady hand and good planning to cut a custom window into an existing case. Stylish, oddly shaped windows make a bold statement and make showing off a system's internals just that much cooler.
5. **Creative lighting.** It's a fact that the human eye is naturally attracted to bright, colored light, which is why creative case lighting can make a modded rig stand out in a crowd. Properly placed cathodes and LEDs surround a system in a corona of soft light and illuminate its internals to make it easier to showcase and even work on the inside of the system. ▲

Common Modding Missteps

Using dull blades, bits, and cutting wheels. There is no better way to waste time, botch a precision cut, or ruin a side panel than using dull drill bits, cutting blades, or cutting wheels. Dull bits won't bite into the material you're modding and will slide all over the surface, scratching it beyond recognition in the process. Use sharp bits to ensure clean, quick cuts.

Wearing baggy clothing or dangling jewelry. The first time your shirt or a bracelet gets caught in the spinning tip of a high-torque power tool, you'll know why wearing baggy clothes or dangling jewelry is a major no-no when modding. So tuck in the shirt, roll up your sleeves, and take off any bracelets or necklaces before powering up your drill, grinder, or rotary tool. And if you have long hair, it's also at risk. (We've witnessed the results of not taking precautions with this one personally.)

Hole saws are available in various sizes, and you can use them for cutting perfect circles in many different materials.

Failing to wear eye protection. Not wearing eye protection, especially when cutting or drilling materials such as metal or plastic, is like sticking your finger in a fan. You can do it, but you are going to wish you hadn't. You can potentially lose your vision, so use caution and always protect your eyes when modding anything. After all, what's more important, your eyesight or a blowhole you're trying to cut into your case?

Using the wrong tool. You don't use a screwdriver to pound nails, so don't use a power tool for any other purpose than what it's intended for. Drills are for drilling holes; rotary tools are for fine grinding, polishing, or cutting; and reciprocating saws are for cutting away large portions of material. Use the right tool for the right job and your projects will be easier and take much less time to complete.

Painting in a poorly ventilated area. For paints to properly dry and adhere to a surface, you must apply them in the proper conditions. Spray paints especially produce noxious fumes that are dangerous to breathe. When painting anything, make sure that you are in a well-ventilated space and wear a mask for your own safety and for the best results. ▲

come in various sizes with varying tooth patterns for cutting wood, plastics, or metal. They also have a pilot bit in the center that mounts to a drill just like any other bit, except it's surrounded by a cylindrical cutting blade. Hole saws are perfect for cutting blowholes and for creating locations for custom fans. A 3-inch hole saw, for example, can make a circular cut to perfectly accommodate an 80mm fan. Hole saws are also good for creating curved edges when cutting out a case window.

You'll use drills to make pilot holes in a material, which facilitates drilling larger holes or cutting out larger parts of the material.

Basic Techniques

Using rotary tools and a hole saw is a relatively simple process, as long as you're comfortable working with power tools and you follow some basic steps. The most important thing to do when working with any power tool is to use adequate eye protection. When cutting holes or drilling through different materials, especially metal, small chunks of material are likely to fly off the blades or bits. These chunks can do major damage to your eyes. It's your vision at risk, so be careful. Also consider wearing a dust mask; a necessity to protect your lungs.

Before turning your power tool loose, also securely clamp down your material in a clean, well-lit area. For example, if you're drilling into or cutting through a side case panel, the drill's torque can easily cause the entire panel to spin if the drill bit should bind. This could result in serious damage to you and your work. Clamping down your material will prevent this from happening, plus it just makes the job much easier.

We also recommend using a hole punch to create a divot in any material you plan to drill. With a divot in the material, your drill bit is much less likely to slide across the surface. It also helps to use sharp drill bits, as they'll bite into the material more easily and produce cleaner work. When using a rotary tool or drill/hole saw, working at right angles is important. Don't plunge a drill into the material at an angle and rock it back and forth until the drill is straight. This puts excessive pressure on the bit, which could cause it to snap. In addition, rotary tools work best when you hold them at a right angle.

The Gotchas

Although rotary tools and power drills are fairly easy to use, budding case modders tend to make some basic mistakes when working with them. Rotary tools spin at incredibly high rpms, and when you initially place a cutting wheel or grinding bit against a smooth surface, it tends to jerk forward. To avoid a wandering rotary tool and prevent scratching your work, hold the tool firmly and slowly press it against the material you're cutting. Once the blade begins to cut and it recesses within the material you're cutting, it is much less likely to jerk forward.

Power drills also tend to slide around when you're trying to drill into hard, smooth surfaces. Start slowly and once the drill bit begins removing material, crank up the speed until you're done. It's also best to settle for nothing less than sharp bits and cutting wheels. Dull bits will do nothing but prolong the project and produce inferior results. In addition, always do your cutting or drilling with a relatively soft material, such as wood, underneath your work. Pushing a drill bit through your side panel only to crash into concrete is going to damage your bit and potentially damage your work.

Safety glasses should be the first item you reach for before starting any major mod.

Some of these tips and techniques might seem like no-brainers. However, using common sense, reading the user manuals that came with your tools, and following some basic techniques are key essentials to making sure your mods come out the way you plan them. CPU

by Marco Chiappetta

Five Mod-Friendly Vendors

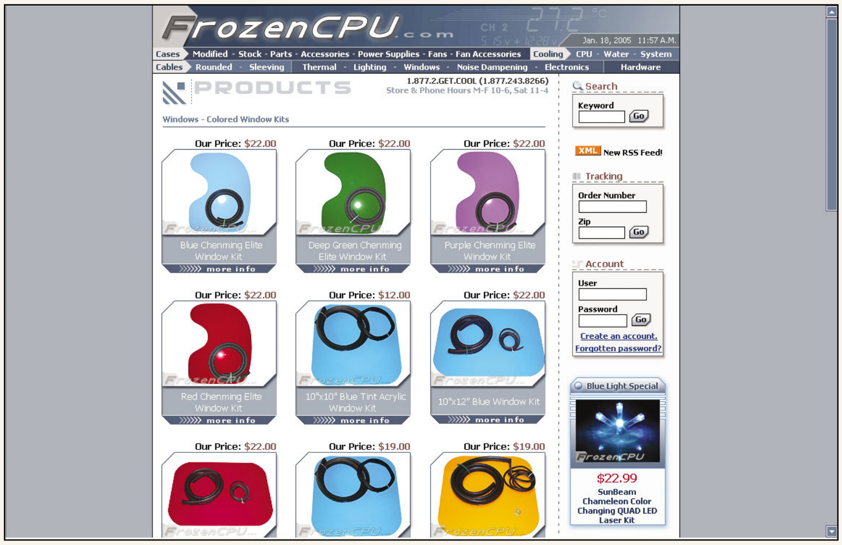
Xoxide (www.xoxide.com; 610/353-1634). Xoxide was founded in early 2000 to provide specialized computer cases and custom-cooling accessories. The company is well-known in the enthusiast and modding communities because it carries newly released and sometimes hard-to-find products. Located just outside of Philadelphia, Xoxide ships products to any location in the United States and Canada.

NewEgg.com (www.newegg.com; 800/390-1119). NewEgg.com is the equivalent of an online supermarket for computer enthusiasts. It doesn't specialize in modding equipment, but it stocks all the most commonly used items, such as lighted fans, cold cathodes, heatsinks, etc. As a bonus, the site has some of the best prices on the Web. The California-based company was founded in 2000 and has since expanded to employ more than 500 employees. According to NewEgg.com, it now serves roughly 2 million customers and is among the top 500 most-visited sites on the Web.

CrazyPC (www.crazypc.com; 888/558-6005). CrazyPC is a Michigan-based etailer with a large selection of modding tools and accessories and premodded parts. It stocks everything from PSU modding toolkits to laser-cut side panels. CrazyPC stocks a large assortment of mod-related items that aren't available at most other online vendors. We especially like its custom premodded cases and hard-to-find tools.

FrozenCPU.com (www.frozencpu.com; 877/243-8266). This New York-based vendor offers all the parts and products necessary to mod cases, video cards, motherboards, and about anything else you can think of. FrozenCPU.com has been catering to the enthusiast community for years and has consistently rated high on ResellerRatings.com, where its current average Reseller Rating is 9.31 out of 10, so you can shop with confidence.

Home Depot (www.homedepot.com; 800/553-3199). You may be surprised to see what is essentially a hardware store listed here, but Home Depot's usefulness to the modding community can't be denied. The store sells the most popular tools at competitive prices. If you need a tool to mod a system, Home Depot likely has it in stock and ready to ship. For instant gratification, you can usually find a local store pretty easily. ▲


FrozenCPU.com
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$22.99
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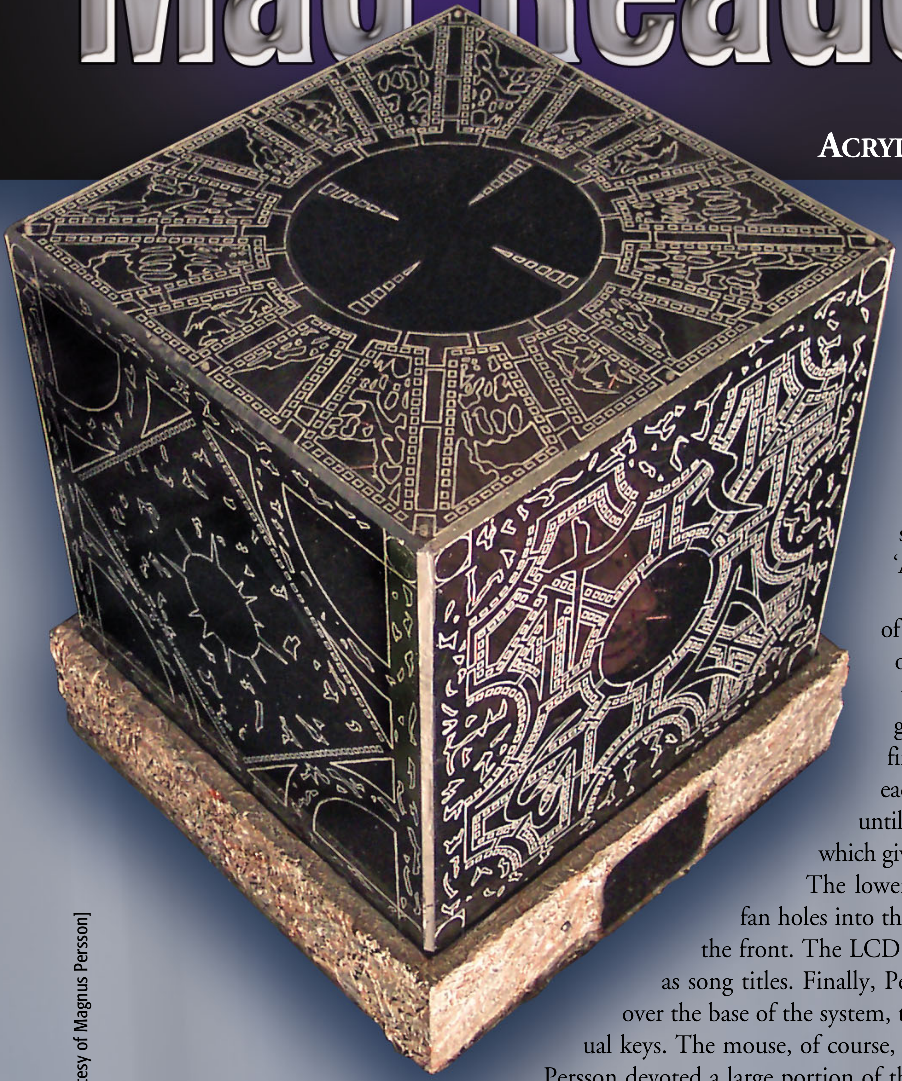
If you're a modder, it's good to have friends that carry the goods. FrozenCPU.com is just one of many mod-friendly Web sites that stocks a wide assortment of modding-related tools and accessories for your alteration needs.

Mad Reader Mod

ACRYLIC + WOOD + MANNEQUIN HEAD = ONE CREEPY PC



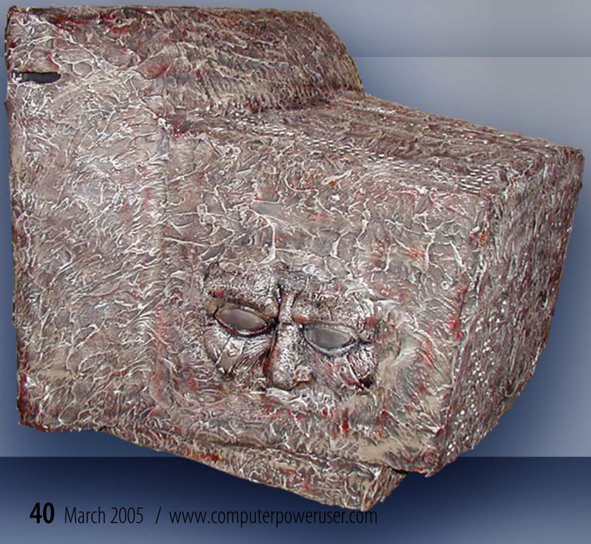
For the record, Magnus Persson, aka [WP@], is well aware of the famous horror movies that feature the puzzle box. The important part of Pinhead rests inside Persson's Puzzlebox PC. "I assumed that everybody knew where I got the idea from, so I thought that name would be good," Persson says. "But I actually got comments from people saying, 'Ah, you stole that idea from a movie.'"

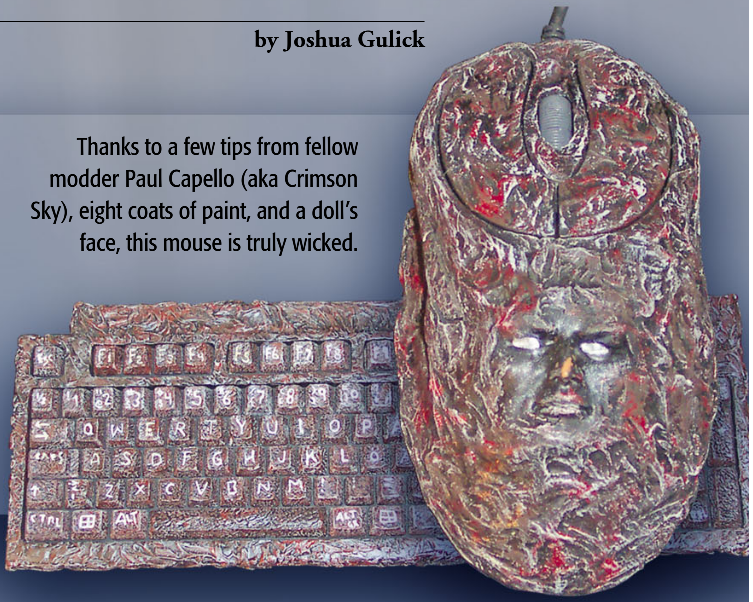
Persson spent several months hunting down pictures of the puzzle box so he could stencil the complex patterns onto the Plexiglas squares that make up the top half of the Puzzlebox. Once he transferred the designs, Persson grabbed a Dremel and etched them into the acrylic. He finished the cube by attaching a dark sunscreen film to each side. Thanks to the film, the PC isn't transparent until you turn on the red LEDs at the base of the system, which give the mannequin head inside an eerie glow.

The lower half of the chassis is entirely wood. Persson drilled fan holes into the back of the chassis and then built a small LCD into the front. The LCD displays system stats and other at-a-glance info, such as song titles. Finally, Persson applied and painted a gritty, textured material over the base of the system, the monitor, and the keyboard, including the individual keys. The mouse, of course, is no ordinary desk rodent; a face haunts the surface. Persson devoted a large portion of the project's 250+ hour completion time to these little details, and the work paid off. The Puzzlebox PC is the creepiest server we've seen. ▲

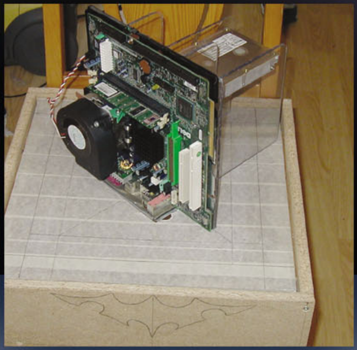
by Joshua Gulick

[Photos courtesy of Magnus Persson]

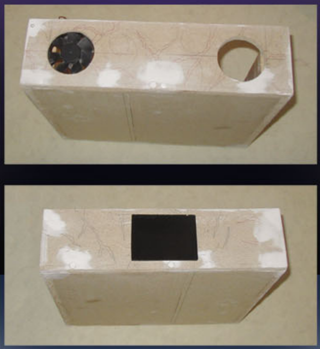




Thanks to a few tips from fellow modder Paul Capello (aka Crimson Sky), eight coats of paint, and a doll's face, this mouse is truly wicked.

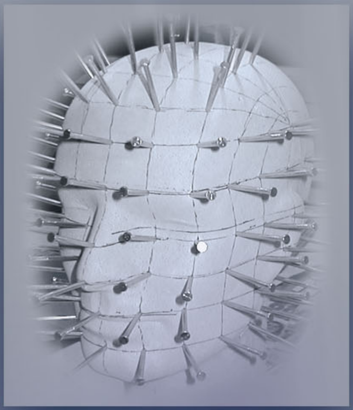


Believe it or not, the mannequin head isn't the only resident of the PC's upper half. Persson built a rack that supports the motherboard and hard drive. The particleboard base houses the PSU and hides the system's cables .



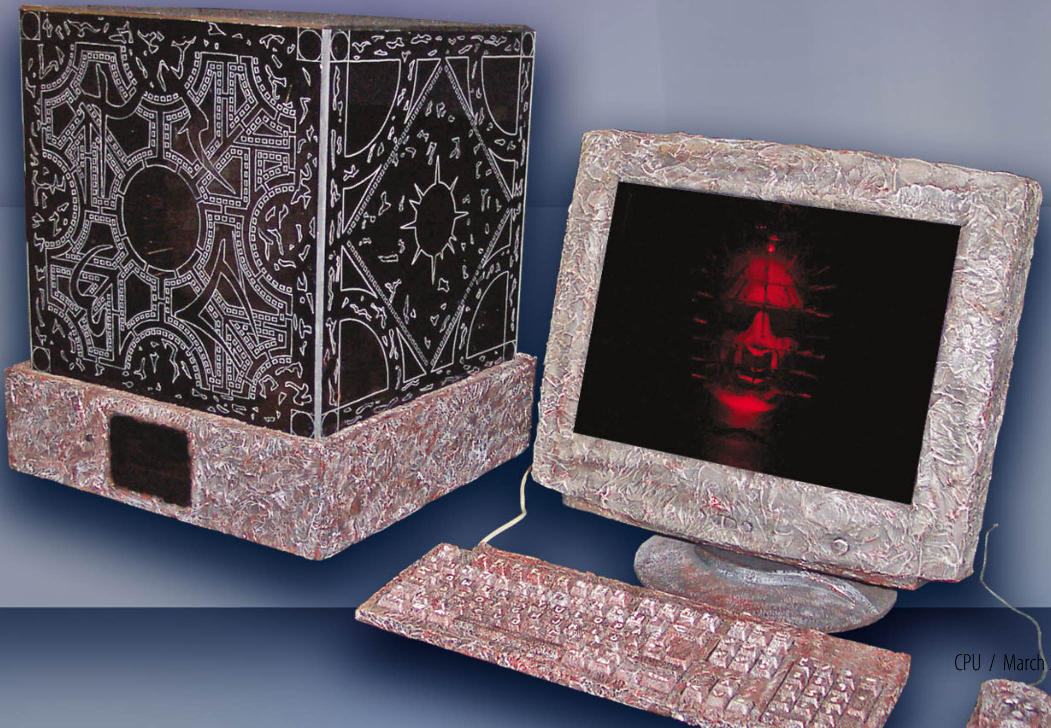
(top) As you can imagine, it gets a little toasty inside the Puzzlebox PC. Persson solved the problem by drilling fan holes into the back of the chassis base. (bottom) Persson installed the LCD early in the process. "It is purely for letters and numbers and displays basically whatever info I need to know," he says.

The Puzzlebox PC is an impressive display of craftsmanship by day, but it's just plain scary by night.



Think you're having a bad day? Persson cut out the back of the nail-riddled mannequin head to make room for the server's hard drive.

Have a computer mod that will bring tears to our eyes? Email photos and a description to madreadermod@cpumag.com. If we include your system in our "Mad Reader Mod" section, we'll send you a $1,500 Newegg.com gift certificate and a one-year subscription to *CPU*.



Persson didn't stop with the Puzzlebox PC; his entire system has a creepy, textured coating.

Advanced Q&A Corner

Get informed answers to your advanced technical questions from *CPU*. Send your questions along with a phone and/or fax number, so we can call you if necessary, to **q&a@cpumag.com**. Please include all pertinent system information.

Each month we dig deep into the mailbag here at CPU *in an effort to answer your most pressing technical questions. Want some advice on your next purchase or upgrade? Have a ghost in your machine? Are BSODs making your life miserable?* CPU*'s "Advanced Q&A Corner" is here for you.*

Bignogin asked: **I bought a ViewSonic monitor, and it has two lines across the screen. You can see these lines on light backgrounds. Although they are very faint, I noticed them and now they're annoy-ing me a bit. I know it's an issue because ViewSonic said that it is a normal thing but it's not defective. I want to return it because I paid a lot of money for this display. I thought that the Pro Series monitors were one of the best. If I go to a different brand will I have this problem, too? Do all CRTs have this problem? Or is it just expensive ViewSonic monitors?**

A: There are two main types of CRT technology on the market today: aperture grille and Invar shadow mask. Your ViewSonic monitor most likely is built on an aperture grille tube. Aperture grille tubes use tiny vertical stripes of color to create the images, while Invar shadow mask technology uses tiny dots of light in a heat-resistant metal to create images. Invar shadow mask technology provides a picture without the visible damper wire shadow lines across the screen that you can frequently see on aperture grille tubes.

With aperture grille technology the two lines you see are called horizontal damper wires. These damper wires are required to maintain the aperture grille's alignment and will cast a shadow on the screen. In most applications, these lines will blend into the background, but they will be visible against lightly colored screens. They are an integral part of the technology and are not considered a defect. In fact, most high-end CRT screens with these faint horizontal lines you describe use aperture grille technology. Aperture grille tubes produce a sharper, more color-saturated image by and large vs. shadow mask technology. Over time you'll learn to not even notice these lines, especially because you now know that they're not some sort of defect. The only way around these damper wires while still preserving high image quality is to go with an LCD, but there are trade-offs associated with LCDs, as well. Regardless, a couple of weeks from now, we're willing to bet you won't even notice those damper wires in that new ViewSonic tube.

George G asked: **I'm running an Athlon 64 3000+ with a K8TN motherboard. A few weeks ago I went to a company party with a friend (he works for a video game company), and I won a GeForce 6800 GT in the raffle. It sounds irrelevant, but what I actually got was a 6800 GT reference board. So I put it into my computer and it seemed to work fine, but I get serious artifacts when running 3D games. The artifacts are the kind that you get when you over-overclock, but I didn't overclock it whatsoever. I've since tried different versions of the BIOS for it, as well as the new NVIDIA drivers 66.93, but got the same result. The only thing is that the artifacts do look a bit dissimilar with different BIOS versions. Because it is a reference card, I have no one to look to but you guys . . . please help!**

A: What you're describing here sounds like a heat-related issue, George. We're not sure what sort of graphics card you had in your machine before, but it sounds like perhaps that new GeForce 6800GT card is cranking up internal ambient temps inside your case, high enough that the card itself is starting to feel the effects of heat. These "artifacts" you describe as indicative of overclocking are actually telltale signs that your graphics engine or memory chips are overheating, which certainly can be the result of an overly aggressive overclock but also could just be caused by excessive system temperatures that arise from improper case ventilation. Inherently, GeForce 6800 series cards are built on power-hungry high-end graphics engines that can radiate a lot of heat inside your case. You'll need to somehow compensate for that extra heat.

We recommend first checking to see that the heatsink and fan assembly on the 6800 GT is secure and aligned properly on the card, although we doubt that's your issue. Additionally, you can then check internal case temps with a "health monitoring" utility

Inherently, GeForce 6800 series cards are built on power-hungry high-end graphics engines that can radiate a lot of heat inside your case. Make sure you have ventilation fans running inside your case that intake adequate amounts of cool air and exhaust warm air.

> “. . . because the 0.09 micron Athlon 64s consume less power, you may even save a few bucks on your electricity bill should you leave the system on 24/7 as you stated.”

such as Motherboard Monitor (mbm.livewiredev.com). If your internals are above 45 degrees Celsius or so, that could be the problem. Make sure you have good case ventilation with at least two case fans installed, one on the lower-front side of your chassis as a cool air intake and one on the back side of your chassis as a hot air exhaust. If you have the ability to install another intake fan on the side panel directly across from the graphics card, all the better. If that doesn't clear up your problem, the next thing to check is your power supply. We recommend no less than a solid brand-name 350W unit, preferably 400W if you can swing it, to power that GeForce 6800GT.

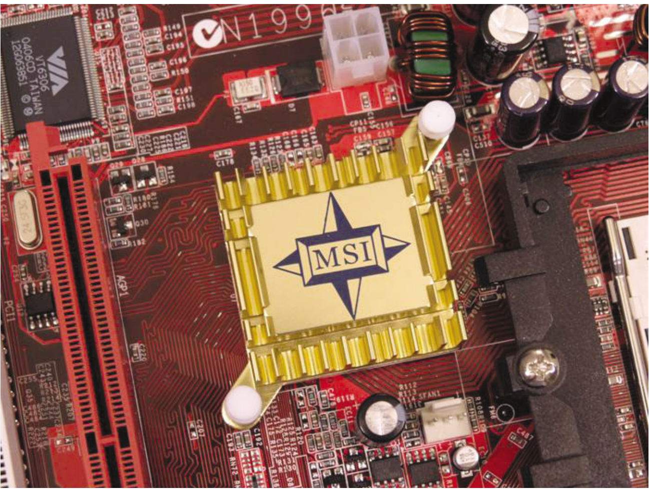
The one final area you might consider is the speed that your AGP bus is running on that K8TN motherboard. If you are overclocking the processor and memory, without an AGP bus speed lock enabled in the BIOS, you could also be overclocking the AGP bus/slot that the 6800 GT is running on. Whenever possible, set the AGP bus in your BIOS to operate at its standard 66MHz frequency. Overclocking that bus yields minimal gains but can lead to significant system instability and could possibly be the root cause of your artifacts, as well.

BlazinKhan asked: **I have an ASUS P5AD2 Premium mobo. The power supply I have is a high-end Ultra X-Connect 500-watt model. I went to plug in the main power from the power supply to the mobo and the pins don't match. My mobo has 24-pin connector and my power supply has a 20-pin ATX power cable. In my ASUS motherboard manual it says, "When using an ATX 12V PSU with a 20-pin power plug, make sure that it can provide at least 15A on the +12V lead, and a minimum power of 350W. Use of an ATX 12V PSU with a 20-pin power plug is not recommended." I think it will still plug in leaving two holes on top and two holes on bottom open, but I'm not sure and I don't want to hurt anything trying it out. Can you let me know if this PSU will work with my mobo?**

A: We have actually tested this specific motherboard with a 430W Enermax ATX-12V PSU with its 20-pin power plug, and it ran just fine. It was actually completely stable during hours of testing. In fact, you can plug the 20-pin connector into that 24-pin socket and leave those additional power and ground sockets open with no problem. Additionally, the Ultra X-Connect supply you listed here is rated for 34A across the +12V rail, as well, so that should not be a problem. The specific power supply you have is a well-made unit and should be up to the task of powering that ASUS board with relative ease.

The beauty of that supply's X-Connect design, with its detachable cables, is that the manufacturer is also currently selling 24-pin ATX power connectors that you can use with your model. Check out the Ultra Products Web site (www.ultraproducts.com), or you can buy the connectors directly from the manufacturer (even in nice, bright UV reactive blue, orange, or green colors). We recommend getting one of those cables as soon as possible, which will allow you to distribute more power

Ultra Products sells 24-pin ATX power cables that can be used with its line of X-Connect power supplies. These will support the latest 24-pin ATX power connector requirements on new Intel i915 and i925 chipset-based motherboards.



Passive coolers, such as the heatsink installed on the MSI K8T Neo2's northbridge, require a constant flow of air to be most effective.

over those un-used pins. This will lead to better overall system stability.

GoldenBoy asked: I read your review of the ATI Mobility Radeon 9700 on HotHardware and wanted to ask you some questions. I am thinking about buying a laptop with these specifications:

- Sony VAIO VGN-S270 laptop
- Intel Pentium M Processor 735 (1.70GHz, 2MB L2 Cache, 400MHz FSB)
- 768MB DDR-SDRAM
- 13.3-inch WXGA TFT with XBRITE LCD technology
- 64MB ATI Mobility Radeon 9700
- Windows XP Professional

I am almost ready to buy it, but because I will be playing some brand-new games on it, I thought I'd ask an expert before placing the order. How do you think that laptop will run games such as Half-Life 2, Doom 3, and Far Cry?

A: Well GoldenBoy, that laptop you've got in mind seems really nice, but there is one major difference between the model that we tested and the one you plan to purchase. The model that we tested had a 256MB frame buffer, and the one you plan to purchase has a 64MB frame buffer. With a maximum of only 64MB of video memory available for textures and other game data, you'll likely experience some jerkiness as textures are swapped in to and out of main memory when that 64MB gets filled, which would definitely happen running games such as Half-Life 2, Doom 3, and Far Cry at higher-image-quality settings.

To somewhat alleviate this problem, you'll have to run the games you mentioned at lower-detail settings; Medium Quality with all of the games you mentioned should be fine. If there is an option to upgrade the video memory on the laptop though, you should definitely go for it. With a larger frame buffer, you'll be able to play more games in their high-quality modes. But with only 4-pixel pipelines, the Mobility Radeon 9700 isn't going to be a gaming powerhouse. It'll perform like a Radeon 9600 XT in most circumstances, so you may want to check out some recent 9600 XT reviews on the Web to get an idea of how it performs with newer games. Also note that the 13.3-inch screen that comes with this VAIO has a native resolution of 1,280 x 800. When gaming on this laptop, you will have to run most games at 1,024 x 768 or lower because the majority of games out there won't support the laptop's native resolution.

Nicholas C. asked: I want to build a system that'll run as quiet as possible, but it's also got to be a good performer. I'm going to go with one of Sapphire's Ultimate video cards because they've got the largest passive coolers I've found, and based on the article I read a few months ago in CPU about making a SFF run quietly, I'm going to use one of Seagate's Barracu-da hard drives. I'm not sure about which motherboard and processor to choose though. What would you recommend for a system that's going to be on 24/7, has to run quiet, and needs to be a decent performer for gaming?

A: Based on some recent testing we've done with AMD's relatively new 0.09 micron Athlon 64 processors, we'd say that a Socket 939 Athlon 64 based on the Winchester core and MSI's K8T Neo2-FIR motherboard would be a perfect fit for the system you'd like to build.

AMD's 0.09 micron Winchester core is currently used in its Athlon 64 3000+, 3200+, and 3500+ processors. We did a direct comparison of a 0.09 micron A64 3500+ and a 0.13 micron A64 3500+ and found that the 0.09 micron processor ran cooler and consumed much less power than its 0.13 micron counterpart. On average, at similar clock speeds, the 0.09 micron 3500+ ran two to five degrees cooler than the 0.13 micron 3500+, and it also consumed 8 to 30 watts less power depending on the situation. This makes them a perfect match for a quiet CPU cooler such as Zalman's CNPS7000B-AlCu, and because the 0.09 micron Athlon 64s consume less power, you may even save a few bucks on your electricity bill should you leave the system on 24/7 as you stated. The MSI motherboard we recommend also seems to be a good fit for this system. It's inexpensive, it has a passive northbridge cooler, which won't generate any noise, and over extended periods of testing, we found it to be very stable and a good performer. In fact, AMD actually shipped the K8T Neo2-FIR with its Athlon 64 FX-55 review systems when that processor was originally launched a few months ago.

We have one last piece of advice. With passively cooled video cards and motherboards, it's extremely important to have adequate case ventilation. Without a sufficient amount of air circulating through the case, a system such as this could build up excessive amounts of heat and become unstable over time. In conjunction with your power supply's fans, we'd also recommend at least one intake fan and one additional exhaust fan. ▲

by Dave Altavilla and Marco Chiappetta, the experts over at HotHardware.com.

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The Materials, They Are A-Changin'

Phase Change Materials Cooling CPUs

Using phase change to provide cooling is a common, natural occurrence. As sweat evaporates from the skin, it cools the human body. Cooling a glass of soda is as easy as dropping in a few ice cubes—they'll cool the drink as the ice changes from a solid to a liquid.

The idea of phase change is affecting the process of cooling a microprocessor, as well. (No, microprocessor manufacturers aren't placing ice cubes on the chips.) Using phase change materials with a microprocessor involves changing a solid, thermal interface material into a solid/liquid mix, often called a semisolid.

The Need For Cooling

Thermal interface materials are important components in the process of cooling microprocessors. Current CPUs generate about 100 watts of heat per square centimeter. Without a system in place for removing heat, such heat would eventually devastate the components that make up the microprocessor. As the transistors that make up microprocessors become smaller and run faster in the future, they'll generate even more heat.

Cooling fans, heatsinks, and heat spreaders are commonly used thermal conducting components. For such components to efficiently dissipate heat, they need direct contact with the heat source (the microprocessor). Because air is a poor conductor of heat, any gaps between the microprocessor and the thermal conducting component reduce the efficiency of heat dissipation.

Thermal interface materials provide a connection between the microprocessor and any thermal conducting components. Thermal grease is a commonly used thermal interface material. It conducts heat well, and it can change its shape to fill in any odd-shaped, microscopic air gaps. However, thermal grease breaks down as it ages, which hardens it and leaves it unable to provide proper thermal conducting.

Enter PCM (phase change material), which provides excellent thermal conducting while changing from solid to "liquid" as it heats without the aging problems that damage thermal grease.

PCM

Many companies make a phase change material for cooling microprocessors, but most of them follow a similar procedure. Most PCMs involve attaching a section of the PCM to a heat spreader or heatsink and then attaching the thermal device to the microprocessor. As the microprocessor generates heat, the PCM turns from a solid into a liquid (of sorts). The melted PCM actually resembles thermal grease, allowing the PCM to flow into areas where air gaps exist.

Here are some of the available PCM products.

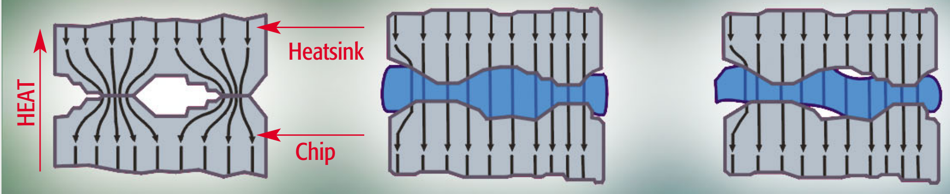
Honeywell. Honeywell is one of the world's leading PCM researchers. From its Electronic Materials Division in Sunnyvale, Calif., Honeywell researchers have created their PCM, called PCM45, which consists of aluminum powder and some proprietary ingredients. Honeywell has combined its PCM45 with a thermal spreader to create its Combo-Spreader Thermal Interconnect System.

Chomerics. Chomerics of Woburn, Mass., offers THERMFLOW brand PCM products. The company offers other types of alternatives to thermal grease, as well, including thermal tape and insulating pads.

Dow Corning. Dow Corning of Midland, Mich., offers a PCM in a film format. Dow Corning designed its PCMs to be easy to apply.

Fujipoly. Fujipoly, with its American headquarters in Carteret, N.J., offers a family of thermal materials in its Sarcon brand, including Sarcon Phase Change Thermal Interface Pads. Two variations of the Sarcon PCM are available, depending on the desired thickness of the PCM layer.

Maximizing Heat Dissipation With PCM



Without a thermal interface conductor , microscopic pockets of air exist between the heatsink and the chip. Even though the two surfaces look smooth, they have microscopic peaks and valleys that prevent a perfect, direct connection between the two.

Because air is a poor conductor of heat, a thermal interface conductor is needed to fill in the air gaps and facilitate the movement of heat away from the chip. Applying thermal grease is one method of removing the air and making a direct connection between the heatsink and chip.

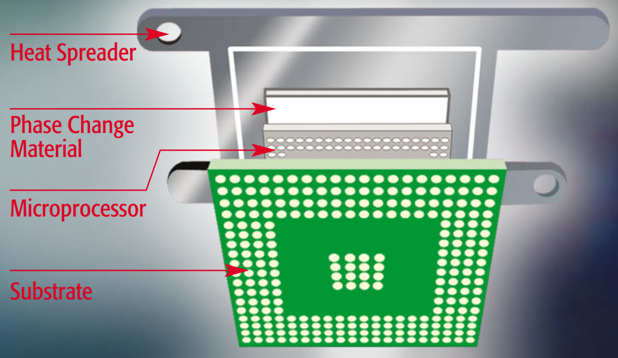
However, thermal grease tends to break down and harden as it's exposed to heat and pressure, causing it to pull away from the surfaces and reintroduce air gaps.

PCM Basics

Companies that make PCMs (phase change materials) don't publicize the exact mixture of components that make up the PCM, but aluminum powder appears to be a significant ingredient in most PCMs.

Most PCMs begin to soften at about 120 to 140 degrees Fahrenheit (50 to 60 degrees Celsius), and most companies also offer thickness variations in their PCM products, usually between 0.003 and 0.010 inches. Variations in thickness help determine the thermal resistance and the thermal conductivity of the PCM.

Shown is a typical PCM configuration. ▲



Source: Honeywell, Chomerics, Fujipoly

Power Devices. With its Thermstrate TC PCM, Power Devices of Laguna Hills, Calif., lets users apply a thin film to a microprocessor surface or to the heatsink or heat spreader. Thermstrate TC works with any type of thermal interface surface.

Other. Phase change cooling and PCMs exist in a few different formats than what we've already discussed. For example, cooling a microprocessor via phase change can also involve changing a liquid to a gas and back using watercooling technology. We discussed various phase change cooling techniques for a microprocessor in the March 2004 ("Cooligy: Making Watercooling Small & Efficient"; pg. 44-46) and June 2004 ("Computer Cooling Technologies: The Eternal Struggle Between Good & Heat"; pg. 36-39) issues of CPU.

You'll also see PCMs discussed in contexts that have nothing to do with computing or microprocessors, such as in building construction. In buildings, a PCM can work in conjunction with a solar-heating system. The PCM absorbs the heat from the sun during the day, helping the building stay cool, and then releases the heat at night, providing warmth for the building. When used in a building, most PCMs are solids and don't fully change phase; instead, they go from a hardened material to a softened material.

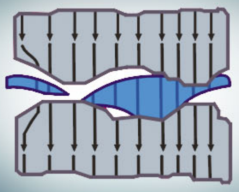
Changes

Intel says PCM will be an important component in the future of chip cooling, but other ideas, such as reducing the amount of power the transistors require and reducing the amount of heat they generate, will be important, as well.

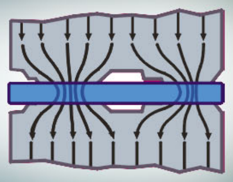
Other industry experts tout the future capabilities of carbon nanotubes, which are microscopic tubes that could exist within PCM or thermal grease and enhance the connection between the chip and the heatsink. Carbon nanotubes would be extremely efficient at diffusing heat.

PCM technology might not be the "magic bullet" that solves all of the heating problems for microprocessors, but it appears PCM will play a key role in cooling for at least the next several years.

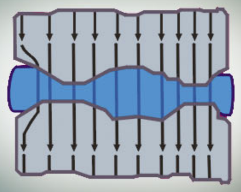
by Kyle Schurman



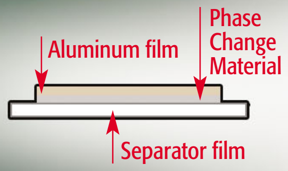
After about two years under most conditions, thermal grease no longer is effective as a thermal interface conductor.



When using PCM, chip manufacturers place the PCM between the chip and the heatsink. Most PCMs initially exist in a solid phase, usually as either film or tape, as shown in blue.



When the PCM heats up, it softens into a phase called a semisolid that resembles a high-viscosity liquid. The PCM then displaces the air and creates a direct connection between the chip and the heatsink. The materials used in PCMs make them less susceptible to drying and pressure-related problems than thermal grease.



Sometimes an aluminum film or another separator film exists between the PCM and the chip.

Source: Honeywell

Round 2: ATI & NVIDIA Throw New Chipsets Into The Athlon 64 Ring

Radeon Xpress 200 & nForce4 Offer Impressive Features

It might not have the testosterone-driven, smack-talk excitement of a pro wrestling match, but the quiet battle between graphics processing kings NVIDIA and ATI continues to yield plenty of excitement for computing enthusiasts.

While the two companies continue to one-up each other in the graphics card market, the spillover competition between the two in the chipset market is gathering steam.

Both NVIDIA and ATI recently released new chipsets for AMD's Athlon 64 market, and both offer very interesting and unique features. The chipsets are also both receiving high praise from analysts.

ATI's Radeon Xpress 200 chipsets will be the first available that offer support for PCI Express and contain an integrated graphics core. Other companies, such as VIA and NVIDIA, are planning chipsets with similar features in the future, but no others are yet available.

NVIDIA recently introduced its latest chipset, the nForce4 with PCI-E support. The nForce4 may not link PCI-E with an integrated graphics core, but it has plenty of very impressive features including strong support for SATA hard drives.

The nForce4 Series

The nForce4 includes support for 20 lanes of PCI-E connectivity and 16 of those PCI-E lanes are dedicated to graphics. The other four PCI-E lanes work to connect other chips on the motherboard or work with x1 PCI-E expansion slots.

The company didn't stop with PCI-E, though. Three different versions of nForce4 provide a variety of features for end users.

nForce4. This is the value chipset of the bunch, and it has all of the basic nForce4 features such as full RAID capabilities, on-chip Gigabit Ethernet, and 10 USB ports. However, enthusiasts will not appreciate the fact that the nForce4 will not let them overclock the 800MHz HyperTransport.

nForce4 Ultra. In addition to matching the features found in the nForce4, the Ultra version includes support for a 1GHz HyperTransport bus, which you can overclock. You'll also find support for 3Gbps SATA drives with the Ultra (along with support for SATA II), compared to the 1.5Gbps SATA drives the basic nForce4 chipset supports (and no SATA II support).

The 3Gb SATA drives support any combination of RAID 0, RAID 1, and RAID 0+1 configurations. Also, users can combine SATA and PATA disk devices within any single RAID array under the Ultra chipset. With the nForce4 SATA ports and support, end users can have as many as eight devices connected at once. In addition to having those devices work in any combination of RAID configurations, nForce4 will support on-demand changes in RAID configurations.

As well as SATA II support, the Ultra chipset provides support for SATA hot-swappable devices and NCQ (Native Command Queuing). Although NCQ-supported hard drives are still rare, they should become more available in the near future. NCQ improves the efficiency of seek times in a hard drive by minimizing the movement of the hard drive's mechanics. Even though such improvements only shave a tiny fraction of a second off search times, they represent large differences in seek times among hard drives with and without NCQ support.

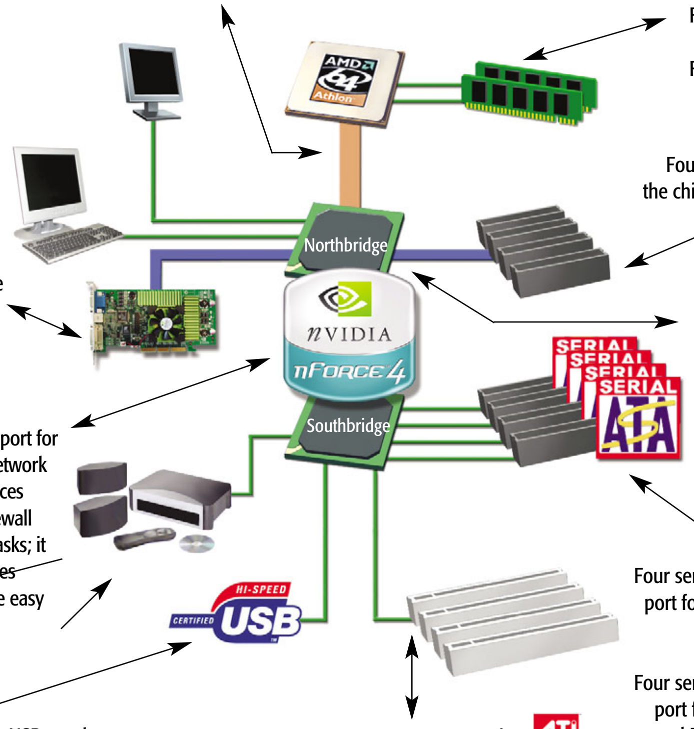
nForce4 SLI. NVIDIA's nForce4 SLI (Scalable Link Interface) chipset matches the features found in the Ultra chipset and adds support for multiple video cards. When it uses one video card, the SLI chipset supports the card with an x16 PCI-E slot. When the SLI chipset uses two NVIDIA video cards,

ATI & NVIDIA Chipset Features

The newest chipsets from ATI and NVIDIA are designed for the AMD Athlon 64 CPU and offer plenty of interesting features. ATI's Radeon Xpress 200 series chipset uses a pair of chips, a northbridge, and a southbridge. The two chips are connected via two lanes of PCI Express interface. NVIDIA's nForce4 series chipset consists of a single chip. ▲

KEY: ATI Specifications for ATI Radeon Xpress 200 chipset

nVIDIA Specifications for NVIDIA nForce4 SLI chipset



ATI HyperTransport link connects the CPU with the northbridge at speeds of up to 1GHz

nVIDIA HyperTransport link connects the single-chip chipset with the CPU at speeds of up to 1GHz

ATI A x16 PCI-E link can be divided into two smaller links for use by two devices

nVIDIA A x16 PCI-E link with the ability to become two x8 PCI-E links to take advantage of NVIDIA SLI technology

nVIDIA NVIDIA's chipset includes support for ActiveArmor, a system and network protection feature that enhances NVIDIA's hardware-based firewall and frees the CPU for other tasks; it also offers nTune, which makes tweaking system performance easy

ATI AC'97 audio

nVIDIA AC'97 audio

ATI Eight USB 2.0 slots

nVIDIA 10 USB 2.0 slots

ATI Up to seven PCI slots

nVIDIA Up to six PCI slots and full support for Gigabit Ethernet

Four 184-pin memory sockets ATI

Four 184-pin memory sockets nVIDIA

Four x1 PCI-E links; also serves as the chipset's Gigabit Ethernet source ATI

Four x1 PCI-E links nVIDIA

HYPERMEMORY technology is available through this chipset, and offers an optional local frame buffer configuration; northbridge also includes integrated graphics with DirectX 9 support ATI

Four serial ATA ports, along with support for RAID 0 and RAID 1, and two or four parallel ATA channels ATI

Four serial ATA ports, along with support for Native Command Queuing and RAID 0, RAID 1, and RAID 0+1, and four parallel ATA channels nVIDIA

however, it reprograms the PCI-E to support two x8 PCI-E slots. As a result, switching between x16 and x8 PCI-E slots is as easy as making an adjustment to the motherboard.

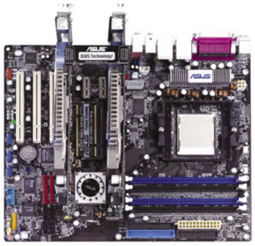
nForce4 Features

Fans of NVIDIA's nForce3 250 chipset will appreciate the fact that the nForce4 is largely based on the previous chipset. With nForce4, NVIDIA also continues the single-chip setup that it used with nForce3, rather than the northbridge/southbridge dual-chip setup commonly found with most chipsets. Because the Athlon 64 contains an on-chip memory controller, a

New Motherboards

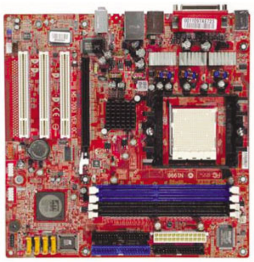
Late in 2004, ASUS and MSI introduced new motherboards based on the new chipsets from NVIDIA and ATI. Here are the specifications for two of the motherboards–the A8N-SLI Deluxe from NVIDIA and the RS480M2-IL from MSI. ▲

ASUS A8N-SLI Deluxe



--CPU: Socket 939 for AMD Athlon 64 FX/Athlon 64
--Chipset: NVIDIA nForce4 SLI
--Memory: Four 184-pin DIMM sockets, maximum 4GB (DDR400 and others)
--Form factor: ATX form factor, 12 x 9.6 inches

MSI RS480M2-IL



--CPU: Socket 939 for AMD Athlon 64 FX/Athlon 64
--Chipset: ATI Radeon Xpress 200
--Memory: Four 184-pin DIMM sockets, maximum 4GB DDR400 (and others)
--Form factor: Micro-ATX form factor, 9.6 x 9.6 inches

Sources: ASUS, MSI, ATI, NVIDIA

single-chip chipset such as NVIDIA has created should combat some of the memory latency that dual-chip chipsets can experience when working with an on-chip memory controller.

Compared to nForce3, NVIDIA adds support for PCI-E (in all three nForce4 versions) and for its SLI technology (only in the nForce4 SLI version). NVIDIA also increases the number of USB 2.0 ports from eight to 10 in all three versions of nForce4.

A few new features are available, as well.

ActiveArmor. ActiveArmor is a dedicated hardware engine that provides network security without the need to tax the CPU. NVIDIA says ActiveArmor reduces the CPU utilization to about 10%, instead of the 75% utilized with most software-based firewall solutions. The basic nForce4 chipset doesn't support ActiveArmor, but the other two chipset versions do.

NVIDIA's demonstrates its emphasis on integrated networking capabilities with its ActiveArmor technology. However, other chipset makers seem to be moving away from including integrated networking with their chipsets.

nTune. NVIDIA named its performance configuation utility nTune. All three chipsets in the nForce4 series support nTune. With nTune, users have the option to use the performance configuration utility without the need for the motherboard manufacturer to build support into the BIOS, which was required in nForce3. Through an easy-to-use nTune menu screen, users can fine-tune the performance of the hard disk or the memory. Benchmarking capabilities are included as well, allowing users to compare different settings. Users will find significant advantages with nTune in the nForce4 vs. what was available with nForce3.

The Xpress 200 Series

As is the case with NVIDIA's nForce4, ATI's Radeon Xpress 200 series represents the company's first two PCI-E chipsets made for the Athlon 64 CPU. The Radeon Xpress 200 series has two versions: the 200 and the 200P. The Xpress 200 features the RS480 as the northbridge in the chipset and the SB400 as the southbridge. The Xpress 200P features the RX480 as the northbridge and the SB400 as the southbridge. (You'll sometimes see the Xpress 200 referred to as the RS480 and the Xpress 200P referred to as the RX480.)

Another nice feature of the two Xpress 200 chipsets is their overclocking possibilities. According to ATI, the Xpress 200 series of chipsets support overclocking of the HyperTransport link while maintaining the standard clock speed for the PCI-E lanes.

ATI says it hopes its Xpress 200 series chipsets will eventually appear in a variety of products. Initially, OEMs will be the primary customer for both Xpress 200 series chipsets, but ATI expects its chipsets will appear in Windows XP Media Center PCs, workstations, servers, and mobile PCs.

Integrated Graphics On The Xpress 200

The Xpress 200 features a Radeon integrated graphics core that includes support for DirectX 9. (The Xpress 200P does not include integrated graphics.) The integrated graphics core is similar to ATI's Radeon X300 core, but it has only two rendering pipelines, half of what's available in the Radeon X300 core. The Xpress 200's integrated graphics core occupies about 90% of the northbridge chip.

For more flexibility, users have the option to run an ATI graphics card at the same time as the IGP, according to ATI. Running this setup, called SurroundView, gives the user the option to create a three-monitor configuration. The integrated graphics runs one monitor, while the standalone ATI graphics card runs the other two monitors. The integrated graphics support both VGA and DVI outputs.

ATI isn't the first chipmaker to include integrated graphics in its chipset; Intel included integrated graphics that support DirectX 9 in its recent chipset named the 915G. Despite this similarity, ATI's intergrated graphics are based on the architecture found in the Radeon X300 core, which analysts say should yield strong results for an integrated graphics solution, and, as a result, gamers should notice very few game incompatibilities.

Obviously, the integrated graphics core in the Xpress 200 is scaled down from what you'd find in a standalone graphics card, but it still provides some nice results. You can't run the latest games with the most complex graphics settings using only the integrated graphics core, but you should be able to at least play the latest games with scaled-down graphics demands. However, if you want top-of-the-line graphics capabilities, you will need to add a standalone graphics card to the Xpress 200's integrated graphics.

The integrated graphics in the Xpress 200 include two pixel pipelines, both of which use DirectX 9 pixel shaders. However, the IGP does not handle vertex shaders as do most standalone GPUs, which leaves most of the processing of vertex shaders to the main CPU.

Integrated graphics are not included on most of the Athlon 64's chipsets, in part because the Athlon 64's on-chip memory controller causes some memory latency problems for graphics memory. As a result of these memory latency difficulties, ATI has attempted to work around these problems and now includes support for one or two frame buffer memory chips mounted directly on the motherboard, which have direct access to the northbridge. ATI says most motherboard manufacturers will either include a one-chip 16MB frame buffer or a two-chip 32MB frame buffer; however, some manufacturers won't even include the frame buffer memory chips because of the extra cost involved.

PCI-E On The Xpress 200 Chipsets

Both of the Radeon Xpress 200 series chipsets connect to the Athlon 64 CPU via a 1GHz HyperTransport link. The HyperTransport link is 16 bits wide in each direction.

You'll also find 22 lanes dedicated to PCI-E with both Radeon Xpress 200 series chipsets. Under most setups, 16 of the 22 lanes are dedicated to a PCI-E x16 graphics slot. Two of the lanes serve as a link between the northbridge and southbridge, and the final four lanes serve the PCI-E x1 slots.

The Xpress 200 Chipset's Southbridge

In the past, other chipmakers supplied ATI with its southbridge chips. Now, however, ATI says its southbridge chips are built by its own developers for both of the company's Xpress 200 series chipsets.

Somewhat surprisingly, ATI's southbridge contains only two PCI-E lanes, both of which only connect it to the northbridge.

Also, the ATI southbridge does not offer support for many newer technologies such as SATA II extensions, RAID 0+1, HD audio, and 3D positional audio. To be fair, the southbridge does offer the basics, including support for four SATA ports, RAID 0, RAID 1, and AC'97 audio.

ATI also includes support in both of its Xpress 200 series chipsets for non-ATI southbridge chips, which means some motherboard manufacturers may include support for some of the aforementioned newer technologies by swapping southbridge chips.

Finally, ATI does not include any Ethernet controllers on its southbridge. Instead, the company says its chipsets will meet any networking requirements through PCI-E, which can support up to 500MBps of bandwidth per networked device.

Round 3?

Even though both NVIDIA and ATI provide strong entries in the chipset market for Athlon 64 CPUs, their chipset releases are not stopping there. NVIDIA expects to begin offering chipsets for Intel Pentium 4 processors sometime in early 2005. It appears that NVIDIA will use a dual-chip chipset with the Pentium 4 because Intel's CPU uses an external memory controller. ATI is also expected to create a set of Radeon Xpress chipsets (currently code-named RS400) that will feature PCI-E for the Pentium 4 sometime in early 2005.

Round 3 in this chipset battle should be another interesting one. CPU

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by Kyle Schurman

3...2...1 MOD!

BOOSTERS THAT'LL BLAST YOUR SYSTEM'S PERFORMANCE

60 Boost Windows XP
Tweak Your Way To Faster WinXP Performance
66 BIOS Performance Boosters
Your 20-Minute Configuration Workout

Ask someone to give you a definition of what a computer power user is and you are likely to get a multitude of different answers. To some it is the kid next door who builds his own computers and fixes their AOL installations. But to others a power user is someone who mods his custom system and tweaks almost every component, including the operating system, for maximum performance. Obviously, we lean more toward the latter definition. Let's face it, anyone with some tools and an instruction manual can build a system, but not everyone has the know-how and guts to modify his rig to make it run at its peak performance.

The types of mods we're talking about aren't necessarily very difficult. Some of them require little more than a few keystrokes or mouse clicks to complete. These are the basic performance boosters that, taken alone, have only a small impact on overall system performance. It's the aggregate effect of a few of these performance boosters incorporated into a single system that will make it run faster, cooler, and more reliably than that stock system slapped together by the guy next door. Even if you take two systems, each built using identical components, the one that incorporates the optimizations mentioned on the following pages will outperform the stock system every time.

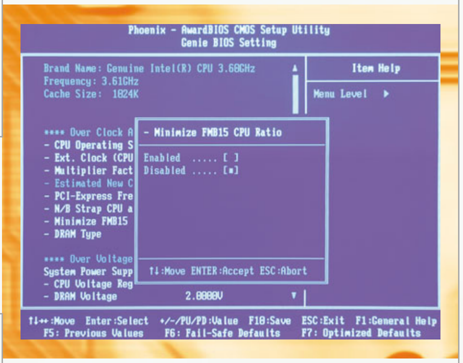
A portion of the performance boosters we'll talk about on the pages in this section are basic hardware mods and tips that'll help your system run cooler and overclock higher than it did before. Another batch of tips will focus on common BIOS tweaks that will help boost performance, and the last group is software-related optimizations that will increase overall system performance. Complete all the tweaks and mods outlined here that pertain to your particular system and we promise you it will be faster than it was before. You may even think of a mod or two of your own along the way.

Intel 925X/925XE Tweaks

Update the BIOS to unlock lower multipliers. It's only been a few months since the initial release of Intel's LGA775 Pentium 4 processors and the 900 Series of core logic chipsets that support them, but they have already matured into a far more enthusiast-friendly platform. Upon their release, news circulated that Intel had incorporated some measures to limit the overclocking potential of the new platform. In addition, DDR2 memory and PCI Express graphics cards were relatively expensive and tough to find. The news was a definite bummer for devout Intel fans, but now PCI-E graphics cards are readily available for roughly the same price as their AGP counterparts, and quality DDR2 memory is much more affordable. Additionally, motherboards sporting Intel's 925X/925XE and 915 chipsets have become increasingly more adept at breaking Intel's anti-overclocking measures and are capable of pushing the platform well beyond its default specifications.

A few enterprising motherboard makers have even figured out how to somewhat unlock high-end P4s to open up a whole new level of overclocking. For the past few years, Intel's (and some of AMD's) processors have been multiplier-locked to prevent unscrupulous people from selling lower-speed processors marked as higher-speed equivalents. For example, a Pentium 4 550 has a multiplier of 17, and the processor runs on a quad-pumped 200MHz (or 800MHz equivalent) frontside bus frequency. The equation 17 x 200MHz gives you the processor's default clock speed, which is 3,400MHz. If you could somehow turn up the multiplier to 18, that same P4 550 would run at 3,600MHz, or the equivalent of a P4 560. There is no guarantee the processor would be stable at that higher clock speed, however, which is one reason why Intel locks its chips at its fabrication facilities.

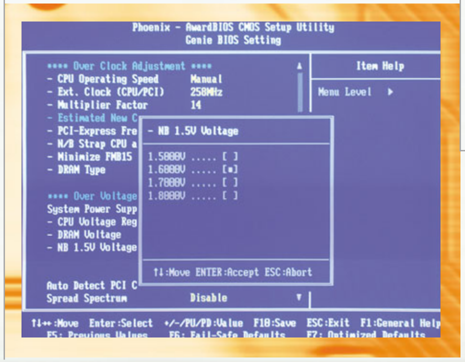
Conversely, lowering a CPU's multiplier will let you run the processor at a higher FSB speed without overclocking it. Using the same P4 550 example, if you configured the processor with a multiplier of 14, it would be clocked at only 2.8GHz using an FSB of 200MHz, which is a full 600MHz below its rated speed. With the right motherboard and RAM, you could then crank up the FSB and the system should remain stable. In fact, with a multiplier of 14, you could use an FSB of 242MHz before you even began to overclock the CPU. And with an FSB that's 42MHz higher than its default speed, more bandwidth is then available, which will increase performance in some circumstances. Some motherboard manufacturers have given users the ability to do this with the right BIOS installed on their motherboards. Be aware, however, that running any component over its specification will usually result in higher temperatures. Thus, it's extremely important to ensure that you've taken steps to ensure the system is running as cool as possible and will not overheat.



```
                 Phoenix - AwardBIOS CMOS Setup Utility
                           Genie BIOS Setting
   Brand Name: Genuine Intel(R) CPU 3.60GHz          ▲  |      Item Help
   Frequency: 3.61GHz                                   |
   Cache Size:  1024K                                   | Menu Level   ►

   **** Over Clock A | - Minimize FMB15 CPU Ratio
   - CPU Operating S |
   - Ext. Clock (CPU | Enabled  ..... [ ]
   - Multiplier Fact | Disabled ..... [■]
   - Estimated New C |
   - PCI-Express Fre |
   - N/B Strap CPU a |
   - Minimize FMB15  |
   - DRAM Type       |
                     |
   **** Over Voltage |
   System Power Supp |  ↑↓:Move ENTER:Accept ESC:Abort
   - CPU Voltage Reg |
   - DRAM Voltage          2.0000V                   ▼
 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
   F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```

A few manufacturers have released new BIOS revisions for their high-end 925X/925XE motherboards that unlock a lower 14X multiplier on P4 550, 560, and 570J processors.



```
                 Phoenix - AwardBIOS CMOS Setup Utility
                           Genie BIOS Setting
   **** Over Clock Adjustment ****                   ▲  |      Item Help
   - CPU Operating Speed       Manual                   |
   - Ext. Clock (CPU/PCI)      250MHz                   | Menu Level   ►
   - Multiplier Factor         14                       |
   - Estimated New C
   - PCI-Express Fre | - NB 1.5V Voltage
   - N/B Strap CPU a |
   - Minimize FMB15  | 1.5000V ..... [ ]
   - DRAM Type       | 1.6000V ..... [■]
                     | 1.7000V ..... [ ]
   **** Over Voltage | 1.8000V ..... [ ]
   System Power Supp |
   - CPU Voltage Reg |
   - DRAM Voltage    |
   - NB 1.5V Voltage |
                     |
                     |  ↑↓:Move ENTER:Accept ESC:Abort
   Auto Detect PCI C |
   Spread Spectrum             Disable               ▼
 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
   F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```

Increasing the northbridge voltage on a 925X/925XE-based motherboard is one way to increase its overclocking potential. You'll have to tweak the PCI-E clock speed also to achieve maximum overclocks with most motherboard brands.

ASUS, ABIT, DFI, and a few other well-known manufactures have exploited a feature of Intel's high-end P4 550, 560, and 570J processors that will let users run these CPUs with a multiplier of 14. Intel's slower Pentium 4 5 Series processors aren't affected. To enable the option that will let you run the CPU at a lower multiplier, though, you'll have to first flash the motherboard with a new BIOS revision that has the option enabled.

Step 1. Go to the support section or download area on your motherboard manufacturer's Web site. Search for an updated BIOS for your motherboard and download it to your system.

Step 2. Some companies have utilities available that will let you flash your motherboard's BIOS from within Windows. With others, however, you have to run from a command prompt. Follow the procedures outlined on the manufacturer's Web site to properly flash your BIOS. Pay special attention to every detail in the instructions because a failed flash can render a motherboard inoperable.

Step 3. With the new BIOS installed, restart your system. As the system is booting, press DELETE or F1 to enter the system BIOS. Go to the Frequency and Voltage Control section of your BIOS. (This may be called SoftMenu, Genie BIOS, or Cell Menu, depending on the motherboard brand.) Locate the option to lower the processor's multiplier, enable the option, and your processor should boot with a multiplier of 14.

Step 4. Increase your FSB speed until the processor is running at or almost at its rated speed. Note that your memory might not be able to run at the higher FSB, so you may also have to lower the FSB-to-memory clock speed ratio to keep the system stable.

Adjust chipset voltages and PCI-E clock speeds for higher overclocks. As mentioned previously, Intel has taken some steps to somewhat limit the overclocking potential of its 900 Series chipsets for LGA775 P4s. These anti-overclocking measures were meant to limit the overclockability of the platform to roughly 10% higher than its rated speed. On 900 Series motherboards, the PCI-E frequency and the frequency of the link between the northbridge and southbridge are monitored when the system powers up. If these frequencies are too far off from their default speeds, the system will likely reboot or even shut down. But with the right motherboard and procedure, it's still possible to push an LGA775 processor and a motherboard based on the 925X/XE or 915 chipset well beyond stock.

The trick to overclocking a motherboard based on a 900 Series chipset is really twofold. First, you will have to increase the chipset voltage (if your motherboard gives you the option) and second, you'll have to overclock the PCI-E link. As is always the case when overclocking, your peak overclock will always be limited by your weakest component. If you have the cheapest DDR2 RAM, a stock cooler, and a generic power supply in your system, it's not going to overclock as high as a system equipped with high-quality Corsair or Kingston RAM; an upgraded copper cooler; and a top-notch, high-wattage PSU. Keep this in mind if your system doesn't overclock quite as high as you would have liked.

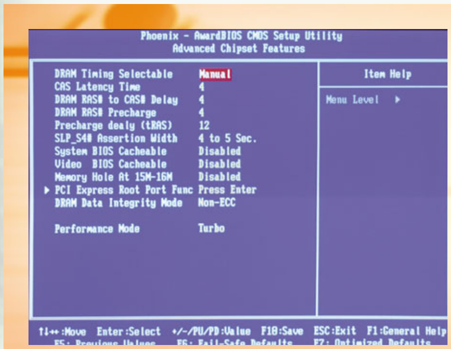
Step 1. Enter your system BIOS and go to the Frequency and Voltage control section. Again, this may be called SoftMenu, Genie BIOS, or Cell Menu, depending on the brand of motherboard.

Step 2. While looking at your motherboard's overclocking menu, locate the option to increase the chipset or northbridge voltage. Press ENTER, and you should be given a list of voltage options. By default it will likely be set to 1.5V. Increase it to 1.6V or 1.7V if there is good circulation in your case. Don't go any higher unless the northbridge is adequately cooled.

Step 3. In the overclocking menu, there should also be an option to alter the PCI-E clock speed. Highlight it and press ENTER. (By default, this option will probably be set to Auto or 100MHz.) You should now see either an empty field where you can enter a new clock speed or a list of clock speeds you can select. The PCI-E slots on today's motherboards are clocked at 100MHz, and PCI-E cards are meant to run at this speed, as well. But there is a bit of tolerance. Input a new frequency a few megahertz higher than default, save the changes, and reboot the system. Let your OS load and use the system for a while to see if it remains stable. If it does repeat this step, further increase the PCI-E frequency until you find the limit. You'll probably peak at about 115 to 125MHz. Once you find your peak stable frequency, knock it back down a couple of megahertz so you're not running the system at the bleeding edge 100% of the time. Should you increase the PCI-E clock speed too high and your system no longer boots, you'll have to clean the CMOS (usually by moving a jumper on the motherboard) and begin again.

Step 4. With the northbridge/chipset voltage increased and your peak PCI-E clock speed dialed in, try raising your FSB speed. You are likely to find that you can hit a much higher FSB after following Steps 2 and 3. Using a DFI LANParty 925X-T2 board, we were only able to hit a peak FSB of about 220MHz before increasing the chipset voltage and PCI-E clock, but after we did, the same board hit a stable 272MHz FSB.

Tweak memory timings for lower latency. Another way to increase the performance of a Pentium 4/925-powered system that's equipped with DDR2 memory is to use lower-latency settings for the RAM. Most of the DDR2 system memory that manufacturers released to coincide with the release of Intel's new LGA775 processors was rated for 533MHz operation at 4-4-4-12 timings at 1.8V. This means that they will run with a CAS latency of 4T, a tRCD (RAS-to-CAS Delay) of 4T, a tRP (Row Precharge) of 4T, and a tRAS (Active-to-Precharge Delay) of 12T at 533MHz with a voltage of 1.8V. The good news is that most of the higher-quality brands of DDR2 RAM that were released when



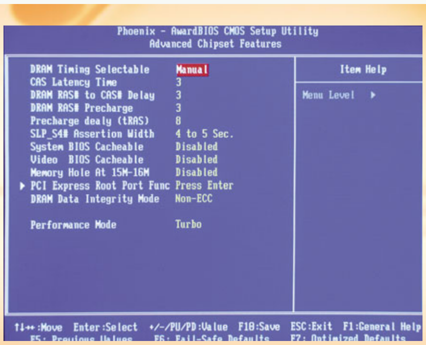
```
Phoenix - AwardBIOS CMOS Setup Utility
Advanced Chipset Features

  DRAM Timing Selectable     Manual                Item Help
  CAS Latency Time           4
  DRAM RAS# to CAS# Delay    4                     Menu Level  ▶
  DRAM RAS# Precharge        4
  Precharge dealy (tRAS)     12
  SLP_S4# Assertion Width    4 to 5 Sec.
  System BIOS Cacheable      Disabled
  Video  BIOS Cacheable      Disabled
  Memory Hole At 15M-16M     Disabled
▶ PCI Express Root Port Func Press Enter
  DRAM Data Integrity Mode   Non-ECC

  Performance Mode           Turbo

↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
  F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```

A majority of the DDR2 memory that was available at the time that Intel's 925X chipset launched was rated for operation at 4-4-4-12 timings, which the BIOS here reflects.



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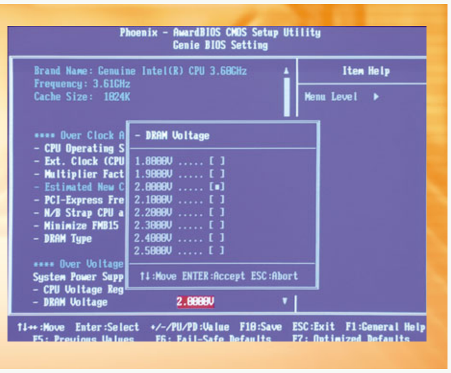
Phoenix - AwardBIOS CMOS Setup Utility
Advanced Chipset Features

  DRAM Timing Selectable     Manual                Item Help
  CAS Latency Time           3
  DRAM RAS# to CAS# Delay    3                     Menu Level  ▶
  DRAM RAS# Precharge        3
  Precharge dealy (tRAS)     8
  SLP_S4# Assertion Width    4 to 5 Sec.
  System BIOS Cacheable      Disabled
  Video  BIOS Cacheable      Disabled
  Memory Hole At 15M-16M     Disabled
▶ PCI Express Root Port Func Press Enter
  DRAM Data Integrity Mode   Non-ECC

  Performance Mode           Turbo

↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
  F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```

We have experimented with numerous brands of DDR2 RAM and have been able to run them all at 3-3-3-8 timings with only a slight bump in voltage.



```
Phoenix - AwardBIOS CMOS Setup Utility
Genie BIOS Setting

  Brand Name: Genuine Intel(R) CPU 3.60GHz      ▲      Item Help
  Frequency: 3.61GHz
  Cache Size:  1024K                                   Menu Level  ▶

  **** Over Clock A  - DRAM Voltage
  - CPU Operating S
  - Ext. Clock (CPU  1.8000V ..... [ ]
  - Multiplier Fact  1.9000V ..... [ ]
  - Estimated New C  2.0000V ..... [■]
  - PCI-Express Fre  2.1000V ..... [ ]
  - N/B Strap CPU a  2.2000V ..... [ ]
  - Minimize FMB15   2.3000V ..... [ ]
  - DRAM Type        2.4000V ..... [ ]
                     2.5000V ..... [ ]
  **** Over Voltage
  System Power Supp   ↑↓:Move ENTER:Accept ESC:Abort
  - CPU Voltage Reg
  - DRAM Voltage               2.0000V          ▼

↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
  F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```

To help maintain stability when running system memory out of spec, it's best to increase the supply voltage. Normally, DDR2 RAM operates at 1.8V, but increasing it to around 2.0V should be safe and let you overclock higher and potentially run with tighter timings.

Intel's new platform launched can run at lower latencies with just a little tweaking.

The current crop of DDR2 system memory is meant to run at a default voltage of 1.8V, but with a slight boost in voltage it's usually possible to squeeze a little bit more performance out of a system because you'll likely be able to run the RAM with tighter 3-3-3-8 timings. Also note that faster DDR2 memory is now being released that runs with even lower latencies. Our aim is to help out those early adopters who jumped on the bandwagon before these faster memory modules were introduced.

Step 1. Enter your system BIOS and go to the Frequency and Voltage control section (often referred to as SoftMenu, Genie BIOS, or Cell Menu, depending on the motherboard brand).

Step 2. Find the option to alter the DDR, DDR2, or memory voltage. Highlight the option, press ENTER, and you should see a list of available voltages. As mentioned earlier, it will probably be set to 1.8V by default. If you have a well-ventilated case, crank the memory voltage to 2.0V. If you're not confident in your system's cooling, stay conservative and only raise the voltage to 1.9V. (*NOTE: Some motherboards increase the voltage in percentages. Don't exceed 10% unless your system is properly cooled.*)

Step 3. Now you'll need to alter the memory timings. On many motherboards the DRAM timing menu items are located in the same place as the overclocking tools. If you don't see DRAM timing options on the same page as your voltage tweaks, you will have to navigate to the Advanced Chipset Features section of the BIOS. You should see an item labeled something like Configure DRAM Timing. The default setting will probably read By SPD or Auto. Change this to Manual and the options for altering CAS, tRCD, tRP, and tRAS timings should be available. Change the CAS latency to 3T, the tRCD to 3T, the tRP to 3T, and the tRAS to 8T. Save your changes and restart the system. If all goes to plan, you should be done. If the system is unstable, however, enter the system BIOS again and try a tRAS of 10T. If you do that and the system is still unstable, change the CAS latency back to 4 and try again.

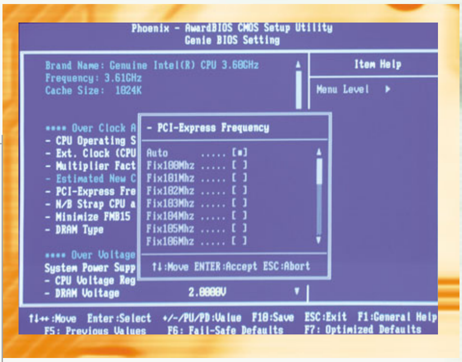
Increasing the PCI Express clock speed on your motherboard will boost theoretical peak bandwidth, but can your graphics card use the extra bandwidth?

NVIDIA nForce 4 Tweaks

Increase PCI-E clock speeds for more bandwidth. In the days of 3dfx, there was a saying that "fill rate is king." Today, it seems bandwidth is the key to high performance. Everywhere you look PC components are getting more and more bandwidth. The memory installed on high-end video cards is getting faster and offering more bandwidth for graphics data. DDR2 system memory and dual-channel memory controllers are now commonplace, offering more bandwidth between the CPU and system memory, and a totally new high-speed serial interface, namely PCI-E, has been introduced essentially to offer more bandwidth to video cards and other peripherals.

The PCI-E slots on your motherboard run at 100MHz and offer up to 500MBps of peak bandwidth per lane (250MBps each direction). So, a PCI-E x1 slot, for example, offers up to 500MBps of bandwidth, and a PCI-E x16 slot offers a theoretical peak of up to 8GBps. Increase that 100MHz, however, and you also increase the theoretical peak amount of available bandwidth. This tweak will have little effect, however, on performance in the vast majority of circumstances. There are very few instances where today's software will saturate the bandwidth that even an AGP 4X slot offers, let alone a PCI-E x16 slot.

In an nForce 4 SLI system where two video cards are installed to share the 3D graphics workload, however, bandwidth is important. In an nForce 4 SLI system, each PCI-E x16 slot has only half the bandwidth of a true x16 slot because it has only an x8 electrical connection. Additionally, there are no real bandwidth-saving measures that are part of NVIDIA's SLI implementation, so you essentially have two graphics cards working with double the normal amount of graphics data, with half the normal amount of PCI-E bandwidth. To boost the amount of bandwidth the PCI-E slots offer on your system, all you have to do is enter the BIOS and increase the PCI-E clock speed. But keep in mind that raising the PCI-E clock will run all PCI-E components out of specification, which could cause instability.



```
Phoenix - AwardBIOS CMOS Setup Utility
Genie BIOS Setting

Brand Name: Genuine Intel(R) CPU 3.60GHz          Item Help
Frequency: 3.61GHz                                Menu Level  ►
Cache Size:  1024K

**** Over Clock A | - PCI-Express Frequency
- CPU Operating S |
- Ext. Clock (CPU | Auto      ..... [■]
- Multiplier Fact | Fix100Mhz ..... [ ]
- Estimated New C | Fix101Mhz ..... [ ]
- PCI-Express Fre | Fix102Mhz ..... [ ]
- N/B Strap CPU a | Fix103Mhz ..... [ ]
- Minimize FMB15  | Fix104Mhz ..... [ ]
- DRAM Type       | Fix105Mhz ..... [ ]
                  | Fix106Mhz ..... [ ]
**** Over Voltage |
System Power Supp |  ↑↓:Move ENTER:Accept ESC:Abort
- CPU Voltage Reg
- DRAM Voltage            2.0000V

↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
  F5: Previous Values   F6: Fail-Safe Defaults   F7: Optimized Defaults
```

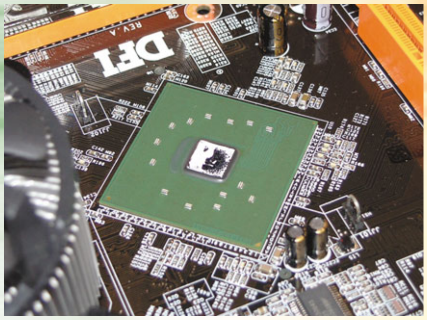
Step 1. Enter your system BIOS and go to the Frequency and Voltage control section (or SoftMenu, Genie BIOS, or Cell Menu, depending on your motherboard).

Step 2. Locate the option to alter the PCI-E clock speed. Highlight it and press ENTER. (By default this option will probably be set to Auto or 100MHz.) You should now see either an empty field where you can enter a new clock speed or a list of clock speeds to select. Input a new frequency that's a few megahertz higher than default, save the changes, and reboot the system. Now let your OS load and use the system for a while to make sure it's stable. If it does, repeat this step and further increase the PCI-E frequency until you find the limit. You'll probably peak somewhere between 115 to 125MHz. Once you find your peak stable frequency, knock it back a couple of megahertz so you're not running the system constantly at the breaking point.

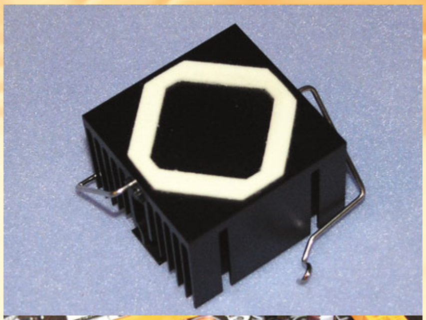
If you increase the PCI-E clock speed too high and the system won't boot, you'll have to clean the CMOS (usually by moving a jumper on the motherboard) and start again. As we mentioned earlier, this tweak will likely have minimal effect on performance, so benchmark your system with your favorite games and applications to see if the gains are worth the risk of running some of your components out of spec.

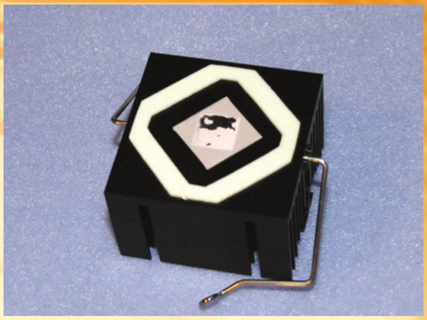
General Motherboard/Chipset Tweaks

Replace thermal pads for lower temperatures. By now, we all know that heat

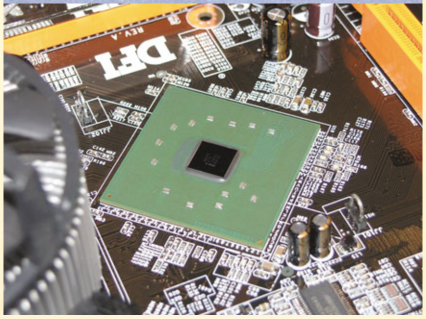


When removing the stock heatsink, the thermal pad will likely break apart and leave residual pieces on the northbridge. You must clean these thoroughly before reinstalling the heatsink.

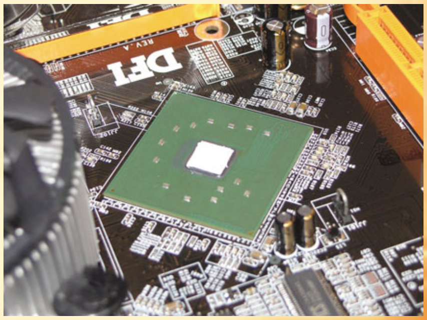




Many motherboard manufacturers use a thick pad as the thermal interface material between the northbridge and heatsink. The pad isn't as effective at transferring heat as a high-quality thermal paste, however.



With the base of the heatsink and the northbridge clean of any remnants of the old thermal pad, you can apply the high-quality thermal paste.



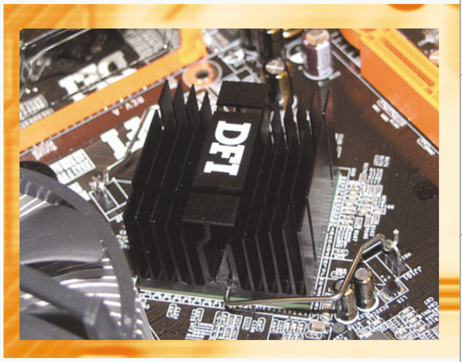
You should apply a small amount of thermal paste to the northbridge in a smooth, thin layer. Use just enough paste to completely cover the chip's surface. No more, no less.

is the enemy, at least when we talk about electronic components. Heat can cause system instability or even destroy hardware if it's not kept in check. Simple aluminum or copper heatsinks are the most common items used to draw excessive heat from the hotter running components in a computer. A heatsink works best when its surface mates perfectly with the surface of the chip it's supposed to cool. The problem is that simply holding a heatsink in place with spring clips isn't enough. Because the surfaces are usually imperfect, tiny gaps form between the heatsink and chip that act as insulators. To alleviate this problem, TIMs (thermal interface materials) are used. A TIM is a thermally conductive substance that's used to fill the air gaps between the two mating surfaces, which results in better heat transfer between the chip and heatsink.

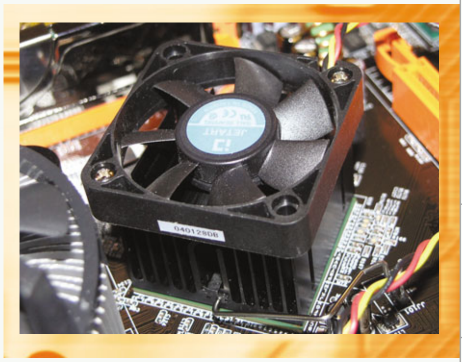
There is also something else to consider: Not all thermal interface materials are created equal. High-quality thermal pastes, such as Arctic Silver 5 or Arctic Alumina, are better performers than the thick, gummy thermal pads or thermal tapes many manufacturers commonly use. By replacing the inferior thermal pads with a higher-performing paste, you can usually shave a couple of degrees off of the operating temperature of a particular chip. In our case we replaced the thermal pad on a heatsink that was installed on the northbridge of an i875-based mobo. We use the motherboard to test the overclocking potential of LGA775 Pentium 4 processors, so every degree we shave off of the operating temperature will help maintain system stability, especially in overclocked situations. The following are the steps we took to do this.

Step 1. Power down, unplug your system, and carefully remove the stock heatsink. Usually this will require removing a few spring clips that hold the heatsink in place. You may have to remove the motherboard from the case if the clips go through the motherboard. With the spring clips disengaged, gently twist the heatsink while pulling it up and off the chip. Don't twist it wildly or jerk up on the heatsink with too much force; you don't want to damage any surrounding components or rip a chip off the motherboard.

Step 2. Thoroughly clean the base of the heatsink and the surface of the chip. The stock TIM may break apart while removing the heatsinks. You need to clean all the residual portions of the TIM before applying the new thermal paste. Use a piece of plastic or even your fingernail to scrape away the largest pieces of the stock TIM. Don't use anything with metal to scrape away the TIM or you'll gouge the heatsink or potentially damage the chip. With the large chunks removed, use a solvent to clean up the leftover adhesives. High-purity isopropyl alcohol and Q-tips work great for this.



A passively cooled northbridge is fine for most situations, but when you are overclocking it could heat up excessively and cause system instability.



By adding a fan to your stock northbridge heatsink, you will drop its operating temperature significantly.

Step 3. With the stock TIM removed and the base of the heatsink and chip's surface completely clean, you can now install the higher-performing thermal paste. We used Arctic Alumina for our mod. Apply a thin layer of thermal paste to the chip's surface and spread it evenly, using just enough thermal paste to cover the chip. Once the thermal paste is in place, you can now reinstall the heatsink and you'll be done.

Install a fan to lower temperatures. If the northbridge chip on your motherboard is outfitted with a passive cooler, there is another surefire way to drop its temperature a bit. Replacing the stock heatsink with an active cooler or simply adding a fan to the existing heatsink is a great way to keep your northbridge cool if you plan to do some serious overclocking. In addition, it will help keep the system stable if it's powered on for extended periods of time.

If you're like us, you've amassed a pile of leftover CPU coolers and video cards over the years. All you need to do is scavenge a 60mm or 70mm fan from a surplus piece of hardware and you're halfway there. If you don't have a fan you can salvage, they're readily available at any electronics store or online for only a few dollars. Get your hands on a fan and a few mounting screws or nylon wire ties and you're ready to go.

Heatsinks work by drawing excess heat away from an electronic component. But they're only effective if there is a constant supply of cooler air being blown across its fins. If a heatsink is installed on a chip and there is no air circulating over its fins, it will only be effective for a very short period of time because it can't transfer any heat back into the air. Once the heatsink reaches the same temperature as the chip it's supposed to be cooling, it'll no longer be effective. But when cooler air is circulated over the heatsink's fins, it's able to release some heat into the air and draw more heat away from the chip. By adding a fan to the heatsink, you essentially supply a constant flow of air that's focused directly on the heatsink's fins. This constant flow of air will make the heatsinks much more effective and it will keep the chip that the heatsink is mounted to running at lower temperatures.

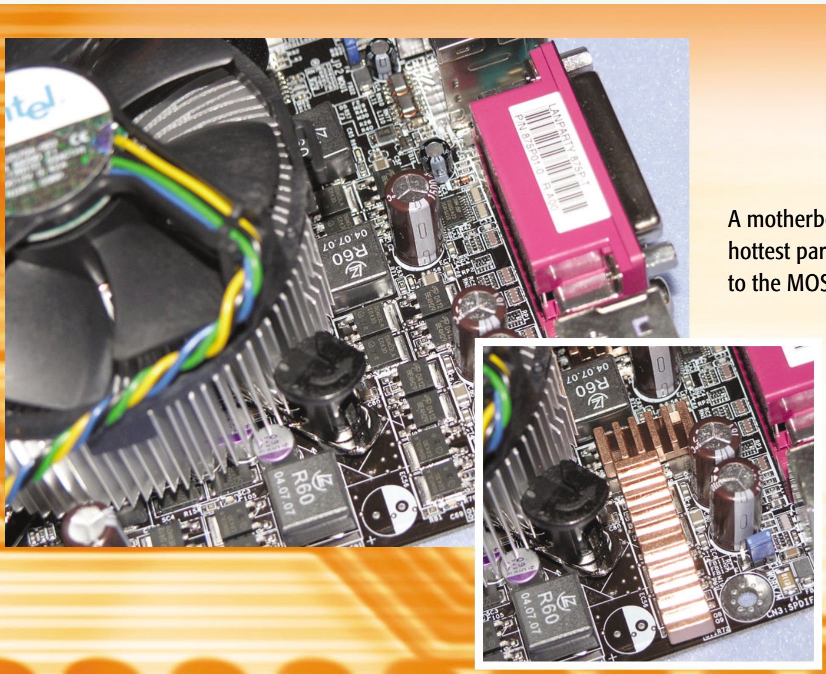
Step 1. Acquire a fan of the appropriate size for your northbridge's heatsink. A 60mm or 70mm fan will work for the vast majority of northbridge heatsinks.

Step 2. Mount the fan to the heatsink. You'll need either four mounting screws or a few nylon wire ties and a little creativity. If you're lucky, the most you'll have to do is bend a couple of the heatsink's fins so that the mounting screws will thread into them. Then just screw the fan in place. If the heatsinks's fins are too far apart to thread a screw in, however, you'll have to figure out a way to secure the fan in place with a couple of ties.

Step 3. Connect the fan to an open fan header on your motherboard or to a spare Molex connector coming from your power supply and you're done.

Install heatsinks for increased VRM cooling. Next to the processor and video card, what is the hottest running part of a computer system? If you said the motherboard's VRM (voltage regulator module), you're right. The VRM is usually made up of a group of coils and MOSFETs (metal-oxide semiconductor field-effect transmitters) surrounding the CPU socket. The VRM takes the electrical feed coming in from the power supply and filters it so that it's sufficiently clean and at the right level for powering all the motherboard's components and the processor, expansion cards, etc. Because the VRM is constantly working at filtering and stepping voltages up or down and

ABIT has incorporated an elaborate VRM cooling and exhaust system, such as this Fatal1ty AA8XE, on a few of its high-end boards.



A motherboard's VRM can be one of the hottest parts of the board. Adding heatsinks to the MOSFETs in the VRM will help them run cooler and more reliably. We mounted copper heatsinks to the MOSFETs on our motherboard using Arctic Silver thermal epoxy.

supplying power to individual components, it also generates heat. When the components in your system are taxed, such as when your video card is rendering a 3D game or when an application is utilizing 100% of your CPU, the voltage regulator module is taxed, as well. This causes the VRM to generate even more heat than usual.

Power-hungry processors, such as those based on Intel's Prescott core, for example, also place an excessive load on a motherboard's VRM. To alleviate some of the stress being placed on the VRM, some manufacturers have begun installing elaborate cooling apparatuses on their motherboards. ABIT in particular has taken the art of VRM cooling to a whole new level. The company designed its Dual OTES cooling system, which consists of heatsinks mounted to the MOSFETs in the VRM, as a shroud to direct air over the heatsinks and a pair of fans to draw air over the heatsinks and exhaust it out of the system.

If your motherboard isn't outfitted with any kind of VRM cooling, though, it's very easy to remedy the situation yourself. All you have to do is find some heatsinks of a suitable size and mount them to the MOSFETs yourself. We've found Tweakmonster.com's nickel-plated copper BGA RAMsinks and Thermaltake's copper RAMsinks work best, but cutting an old CPU cooler into smaller pieces will also work. In addition to the heatsinks, you should also position a case fan to blow air across the heatsinks for the best results.

Step 1. Get your hands on enough heatsinks to cover all the MOSFETs in your motherboard's VRM. It will usually take six or eight heatsinks to take care of the job completely.

Step 2. With your system powered down and unplugged, dry fit the heatsinks in place first. It may seem like you are piecing together a puzzle to get all the MOSFETs covered without touching any surrounding components. You don't want any part of the heatsinks to touch a nearby capacitor or coil, or you could be looking at a potential short.

Step 3. Once you've figured out how you need to arrange the heatsinks, clean the surface of the MOSFETs with a proper solvent, such as high-purity isopropyl alcohol, to eliminate any dust, dirt, and oils. A clean surface is important or the heatsinks won't adhere properly.

Step 4. Mount the heatsinks to the MOSFETs. The easiest way to do this is to use adhesive thermal tape (which usually comes with heatsinks if you have to buy them) and just stick the heatsinks in place. We prefer using a thermal epoxy, however. Arctic Silver thermal epoxy is great for a job like this. Mix the appropriate amount of thermal epoxy and put a smooth, even layer on the surface of the MOSFETs. Then put the heatsinks in place and let the epoxy set. Take special care not to get any epoxy on the MOSFETs' leads because it is electrically conductive.

Tweakmonster.com's nickel-coated copper BGA RAMsinks are available for about $10 in a four-pack at www.crazypc.com/Merchant2/merchant.mv?Screen=PROD&Product_Code=PQ4-5111. Thermaltake's copper RAMsinks, such as the ones we used, are available in an eight-pack for $9.99 at www.crazypc.com/Merchant2/merchant.mv?Screen=PROD&Product_Code=5112.

Now Get To Modding

There you have it, a selection of boosters to better your system's performance. As you know (but we'll still point out), performing most of these mods, if not all of them, will void your warranties, so proceed at your own risk. But hey, power users don't need no stinkin' warranties anyway, right?

by Marco Chiappetta

Volt Mods: More Power, More Performance

Just about every major motherboard manufacturer offers voltage adjustments via the BIOS to tweak processor, memory, AGP, and even northbridge/chipset voltages. Overclockers use these tools to push their systems well past their default specifications. Raising the supply voltage to any of these components usually let users overclock to higher and higher levels—up to a certain point. The options available via the system BIOS aren't enough for some users, though. Instead of swapping out their motherboards for models that offer the extreme voltages they crave, some users simply modify their existing boards to achieve the desired result.

Volt mods are a common practice among hardcore overclockers; we've even covered a few in *CPU*. We explained how to volt mod a Radeon 9800 Pro in our September 2004 issue (page 50). We also explained how to modify a Shuttle AN50R Socket 754 motherboard to supply more voltage to system memory in the April 2004 issue (page 91). With those mods we pushed our Radeon 9800 Pro's core and memory clock speeds to levels exceeding those of a Radeon 9800 XT, and our system memory well past its rated clock speed, as well. We'd love to explain how to modify your specific motherboard to supply more voltage to the memory or northbridge, but unfortunately, volt mods aren't one-size-fits-all. Although the actual process is very similar, each motherboard would require its own article because each uses different voltage regulators and has a different layout.

The voltage regulators on today's motherboards monitor a feedback voltage that's essentially a copy of the output voltage. If the feedback voltage drops too low, the regulator increases the output. If the voltage gets too high, it's then ratcheted down. A volt mod fools the voltage regulator on the motherboard into thinking the output is too low so that it boosts the output. This is done by shorting the feedback pin on the voltage regulator to ground with a resistor. This allows a certain amount of feedback current to leak before entering the voltage regulator, which causes it to increase the output voltage. It's important to use a resistor of the correct value if you plan to volt mod your motherboard, though. If the resistance is too high, there will be little to no influence on the output voltage. If the resistance it too low, the output voltage could reach excessive levels that could potentially damage your components. And as you know, any mod will void your warranty. ▲

Boost Windows XP

TWEAK YOUR WAY TO FASTER WINXP PERFORMANCE

For all of the negative publicity Microsoft and Windows regularly receive, it is easy to forget that for most of us, Microsoft WinXP is a pretty good OS. It runs the programs and games that most people want to run on the computer hardware most people own.

Most of the Windows experts you know who have fast, stable systems didn't get them that way by dumb luck: They know a lot of industrial-strength tips, tricks, and techniques, judiciously applied to take care of known WinXP issues before they interfere with performance. Employing these tips, tricks, and techniques can make the difference between a computer that operates slowly vs. one that works as fast and reliably as the hardware allows. In the following pages, we'll detail the best WinXP tips and tweaks, which will boost your computer's performance like you've never seen before.

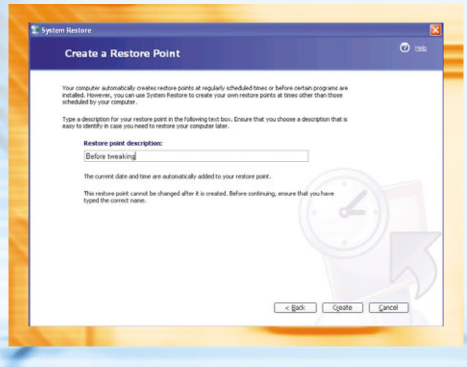
Before We Begin

Some of these tips alter the Windows Registry, some alter the locations of system files, and others change file attributes, so: Backup! Backup! Backup! Although the odds are very slim, there is a chance that a bug, a typo, or some other freak occurrence could render your system unusable.

Ideally, you already have a backup system in place—your backups are stored either on a second hard drive (internal or external), removable optical media (CD or DVD), or at least on another hard drive partition. To back up our system, we like to use Norton Ghost because it can reliably back up the entire Windows partition or even the entire drive (including the MBR [master boot record]) to all three of these destinations.

If you absolutely refuse to perform a whole-system backup, then at least create a Windows System Restore Point and back up your Registry. To create a Restore Point, go to Start, select All Programs, Accessories, System Tools, and System Restore. Select Create A Restore Point, click Next, give the Restore Point a name (such as Before Tweaking), and click Create. If needed, you can restore your system back to this point in time on this same screen. To back up your Registry, click Start, select Run, type **regedit** in the Open field, and click OK. Right-click My Computer and choose Export. Set the Export Range to All, save the file with a name (such as Before_tweaking.reg), and click Save.

If something goes wrong, you can restore the Registry by double-clicking the before_tweaking.reg file and letting it overwrite the old file. If this fails to restore your system, then reload the Restore Point you made (which you can also do in Safe Mode if things really go wrong—press F8 at boot time to launch WinXP in Safe Mode). And if all this fails,



Your computer automatically creates restore points at regularly scheduled times or before certain programs are installed. However, you can use System Restore to create your own restore points at times other than those scheduled by your computer.

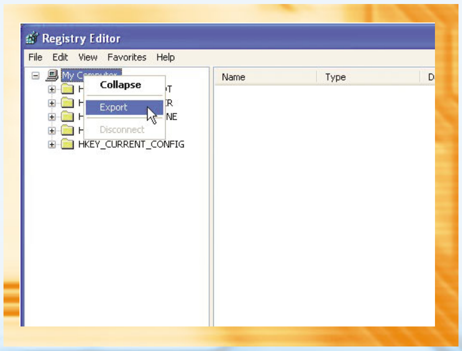
Type a description for your restore point in the following text box. Ensure that you choose a description that is easy to identify in case you need to restore your computer later.

Restore point description: Before tweaking

The current date and time are automatically added to your restore point.

This restore point cannot be changed after it is created. Before continuing, ensure that you have typed the correct name.

At various points in time, Windows creates Restore Points, but creating one yourself and giving it a recognizable name makes restoring after tweaking easy.



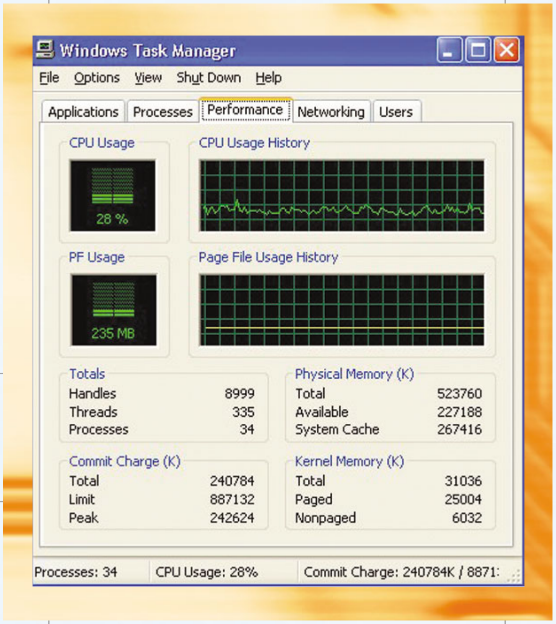
Backing up the Registry is a quick safety net you can always perform quickly. Save the registry backup file to a different drive for even more safety.

then you can still fall back on the back up you made with Norton Ghost or another utility.

Take Baseline Measurements

The only way to be sure if your tweaks are effective is to take before-and-after measurements. There's no need to spend hours and days taking dozens of benchmarks, and because these measurements are just for your own use, there's no need to set up an identical-testing environment that you see in product reviews.

In fact, to take some simple measurements, all you need is a stopwatch and Windows' built-in tools. For starters, time how long it takes to boot and shut down, as well as how long it takes to launch a few programs you always use, such as your browser or word processor. Start the Windows Task Manager (press CTRL-ALT-DELETE and click the Task Manager button if necessary), and check out the Processes and Performance tabs. Write down how many processes are running after you boot, and how much Physical Memory (K) is available.



28 %

235 MB

Totals
Handles 8999
Threads 335
Processes 34

Physical Memory (K)
Total 523760
Available 227188
System Cache 267416

Commit Charge (K)
Total 240784
Limit 887132
Peak 242624

Kernel Memory (K)
Total 31036
Paged 25004
Nonpaged 6032

Processes: 34 CPU Usage: 28% Commit Charge: 240784K / 8871:

The Windows Task Manager displays programs that are running, CPU Usage, available memory, and other details.

However, benchmarking programs have their uses, too. Two of the most popular are useful for determining overall system health: 3DMark03 and SiSoft Sandra Lite. 3DMark03 is intended to test video card performance, but you'll find that as your system gets fixed up, your scores get better and better. Ditto for SiSoft Sandra's CPU, Memory Bandwidth, and Hard Disk speed tests—they fix your system, and your scores get better and better.

Get Your House In Order

Before optimizing Windows, clean up any viruses and spyware, both of which run in the background sapping resources and making your PC unreliable. You'll also need to check for hardware driver problems.

If you already have some form of antivirus software on your computer, run its update feature and perform a full system scan. If you don't have any antivirus software (and you don't want to pay for it), download and install Grisoft's AVG Anti-Virus Free Edition, and let it scan your system. The same goes for spyware; if you have anti-spyware software, run an update, but if you don't have any anti-spyware software, we like Ad-Aware SE Personal Edition and Spybot Search & Destroy. Run both the antivirus and anti-spyware software you have, let them update, and then perform a full system scan and cleaning. If you have a broadband connection and have never run anti-spyware software before, you'll be surprised by what these programs will find.

Over time, hardware drivers have been known to become corrupted or mysteriously uninstall themselves. When this happens, Windows may dedicate a portion of its resources to continuously monitor drivers for a fix. Use the Device Manager to fix this problem: Right-click My Computer, choose Properties, click the Hardware tab, and then the Device Manager button. The Device Manager lists all your hardware in an expandable tree, and if any of the items have a red exclamation point, yellow question mark, or other similar icon, then Windows is aware of a driver problem that needs resolution. The easiest way to solve the problem (most of the time) is to right-click the icon and choose Update Driver. If you have an Internet connection, let the program search the Web for a driver update. If this fails, you may need to visit the hardware manufacturer's Web site and download and install a driver manually.

If there's an entry in the Device Manager that says Unknown Device, try to determine what hardware you have installed that isn't working right and then download and install a new driver from the manufacturer's Web site. However, if your hardware is running reliably and isn't missing a needed feature that's only available with a new driver, don't bother upgrading the driver.

Finally, run Windows Update (windowsupdate.microsoft.com) and download and install the patches, especially those related to bugs and security. If you play a lot of games, you should consider downloading and installing the latest driver for your video card and installing the latest version of DirectX. Some games get a dramatic boost in speed, reliability, and visual quality with the latest drivers and DirectX.

Lighten The Load, Part 1

Most Windows computers automatically run a few programs every time they start up, and that's a convenience. Unfortunately, over a PC's life the many programs you've installed may have added a dozen or more startup programs that, combined, consume vast amounts of memory, CPU cycles, and startup time. Take a look at all the little icons in the Taskbar; most of them represent a program running in the background, loading automatically every time Windows starts up.

Limiting programs that start automatically can yield tremendous improvements in stability and speed, and WinXP has a tool for configuring this: the System Configuration Utility. To launch the utility go to Start, select Run, type **msconfig** in the Open field, and click OK. Then click the Startup tab to see a list of all your computer's startup programs.

The Startup tab lists every file that Windows launches. Those with a check mark are enabled; the first time you run the System Configuration Utility everything is checked, which means that everything listed is running. Believe it or not, WinXP will run fine with all of these items unchecked; however, some of your hardware may not operate (or not operate completely) and, of course, the utilities you actually want won't be running either.

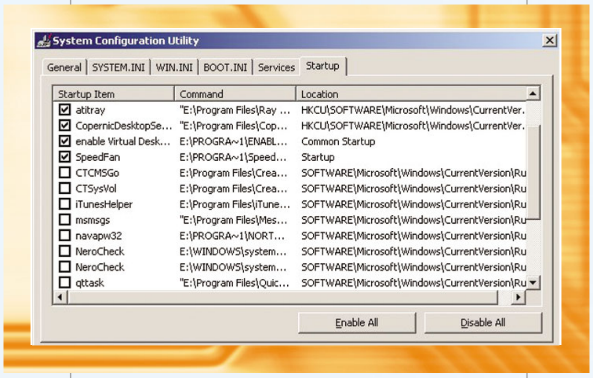
Ideally, you should uncheck those items that you don't need running all the time. For example, do you really need your MP3 player always running in the background? Do you create Adobe PDF files so frequently that you need one of its helper programs always checking for new files to convert? Do you even use Quicken's BillMinder feature? If you don't own an iPod, why would you need the iPod helper applet in memory? If a program isn't working after disabling a helper applet, go back to this tab and re-enable it. And, of course, you can always make an icon for something you disable here and launch it manually when you need it.

Not sure what to disable, or can't make heads or tails out of a cryptic file name? You're not the only one. Fortunately, there are two excellent Web sites that explain almost every program name you're likely to see in the Startup tab. Check out Sysinfo.org (www.sysinfo.org/startuplist.php) and/or the Windows Startup Programs Directory on the Greatis Software company site (www.greatis.com/appdata/atyouroption.htm) to help you figure out what's really necessary and what isn't.

Lighten The Load, Part 2

WinXP (as well as Windows NT/2000) has an additional layer of programs that can launch automatically every time Windows starts up, generally referred to as Services. Think of Services as background programs that don't usually have a user interface; they just run in the background to occasionally perform a system-related task such as maintaining a connection to your UPS, keeping a print server or Web server daemon running, or background indexing the contents of all your text and DOC files.

WinXP can have nearly 100 Services set to run in the background every time Windows starts, and you definitely need some of these Services for Windows to work properly. You can get a quick peek of what Services you have running from the System Configuration Utility's Services tab and, although there are checkboxes here to disable these Services, don't do it here. Unfortunately, it is possible to disable something you actually need, and it's a pain to restore something disabled in the Services tab.



Startup Item	Command	Location
☑ atitray	"E:\Program Files\Ray ...	HKCU\SOFTWARE\Microsoft\Windows\CurrentVer.
☑ CopernicDesktopSe...	"E:\Program Files\Cop...	HKCU\SOFTWARE\Microsoft\Windows\CurrentVer.
☑ enable Virtual Desk...	E:\PROGRA~1\ENABL...	Common Startup
☑ SpeedFan	E:\PROGRA~1\Speed...	Startup
☐ CTCMSGo	E:\Program Files\Crea...	SOFTWARE\Microsoft\Windows\CurrentVersion\Ru
☐ CTSysVol	E:\Program Files\Crea...	SOFTWARE\Microsoft\Windows\CurrentVersion\Ru
☐ iTunesHelper	E:\Program Files\iTune...	SOFTWARE\Microsoft\Windows\CurrentVersion\Ru
☐ msmsgs	"E:\Program Files\Mes...	SOFTWARE\Microsoft\Windows\CurrentVersion\Ru
☐ navapw32	E:\PROGRA~1\NORT...	SOFTWARE\Microsoft\Windows\CurrentVersion\Ru
☐ NeroCheck	E:\WINDOWS\system...	SOFTWARE\Microsoft\Windows\CurrentVersion\Ru
☐ NeroCheck	E:\WINDOWS\system...	SOFTWARE\Microsoft\Windows\CurrentVersion\Ru
☐ qttask	"E:\Program Files\Quic...	SOFTWARE\Microsoft\Windows\CurrentVersion\Ru

All the programs that launch at Windows startup are listed in the Startup tab. Don't forget to stretch the edges of the headings to see the full path name of a listed file.

Instead, Windows has a program to safely disable various Services called the Services Window. To get there, click Start, select Run, type **services.msc** in the Open field, and click OK. By default, the window appears narrower than is useful, so just maximize the window to see all of the columns.

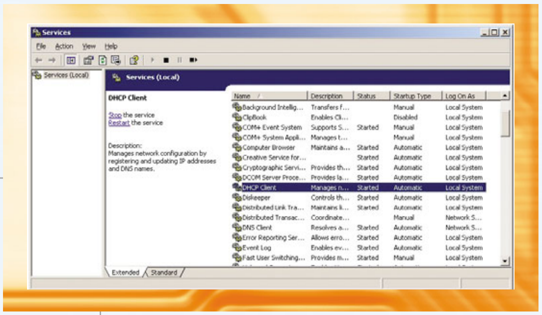
Now that you're able to see all the columns, a few may require an explanation. The Status column displays whether a Service is running; if the field is blank, the Service isn't currently running. The Startup Type column shows how Windows starts a Service—labeled Disabled, Automatic, or Manual. Disabled Services are just that: disabled. They won't run even when another program or service requires them to. Automatic Services start at boot time and may unload themselves from memory when unused for any length of time, though this almost never happens in practice. Manual mode doesn't let a Service launch at boot time and, theoretically, lets it start when another program or Service calls for it, though this rarely happens in practice, either. Therefore, in general, when you find you need a Service, it's best to set it to Automatic. To change a Startup Type for a Service, double-click the Service, use the Startup Type menu to select a different method, and click OK. You'll need to restart for some changes to take effect.

Though most Services have explanatory names and good descriptions, it is hard to tell what you really need and what you really don't because some Services are used by other Services. For example, does Distributed Link Tracking Client really mean anything to you? Fortunately, it does mean something to someone, in this case a fellow with the Internet nom de plume of Black Viper. His Web site (www.blackviper.com/winxp/servicecfg.htm) lists, in detail and plain English, what Services do what and if you really need them. He even divides his recommendations into "Safe" settings, settings for power users, and the bare minimum ("Bare Bones") number of Services needed for Windows to run properly. Matching your Service settings to Black Viper's "Safe" settings can save you tens of megabytes of memory and make your system feel much faster. The difference can be like night and day.

Tweak The Pagefile

Windows can make 256MB of RAM look like 2GB (or more) through the use of a pagefile. Essentially, the pagefile is a large workspace file on your hard drive where Windows can take infrequently used files and data out of your fast RAM and temporarily hold them on the hard drive for later retrieval. To your software, this swapping of memory space is virtually transparent (hence the term virtual memory), and the computer just looks like it has a lot of

Once resized, the Services window allows you to see all aspects of the Services that start with Windows. You can double-click a Service to alter its properties.



DHCP Client

Stop the service
Restart the service

Description:
Manages network configuration by registering and updating IP addresses and DNS names.

Name	Description	Status	Startup Type	Log On As
Background Intellig...	Transfers f...		Manual	Local System
ClipBook	Enables Cli...		Disabled	Local System
COM+ Event System	Supports S...	Started	Manual	Local System
COM+ System Appli...	Manages t...		Manual	Local System
Computer Browser	Maintains a...	Started	Automatic	Local System
Creative Service for...		Started	Automatic	Local System
Cryptographic Servi...	Provides th...	Started	Automatic	Local System
DCOM Server Proce...	Provides la...	Started	Automatic	Local System
DHCP Client	Manages n...	Started	Automatic	Local System
Diskeeper	Controls th...	Started	Automatic	Local System
Distributed Link Tra...	Maintains li...	Started	Automatic	Local System
Distributed Transac...	Coordinate...		Manual	Network S...
DNS Client	Resolves a...	Started	Automatic	Network S...
Error Reporting Ser...	Allows erro...	Started	Automatic	Local System
Event Log	Enables ev...	Started	Automatic	Local System
Fast User Switching...	Provides m...	Started	Manual	Local System

overall memory. (In fact, the pagefile was called the swap file in Windows 3.1 though Me.)

Normally, Windows automatically sets the size and location of the pagefile, and when you only have one hard drive and don't ask for too much from your system, these automatic settings are just fine. If you're looking for a performance boost and happen to have two or more hard drives (and not just multiple partitions on the same drive), there's a way to get a serious performance boost: Move the pagefile away from your Windows drive.

Moving the pagefile away from your Windows drive is simple because: 1) WinXP is always hitting the hard drive to grab Windows and program files; and 2) WinXP is always hitting the hard drive to access the pagefile. So, step 1 must always wait for step 2 to finish before it can act, and vice versa. By placing the pagefile on a separate hard drive, your computer can access Windows, program files, and the pagefile, simultaneously. While doing this, you can also make sure the pagefile isn't fragmented and is sufficiently large.

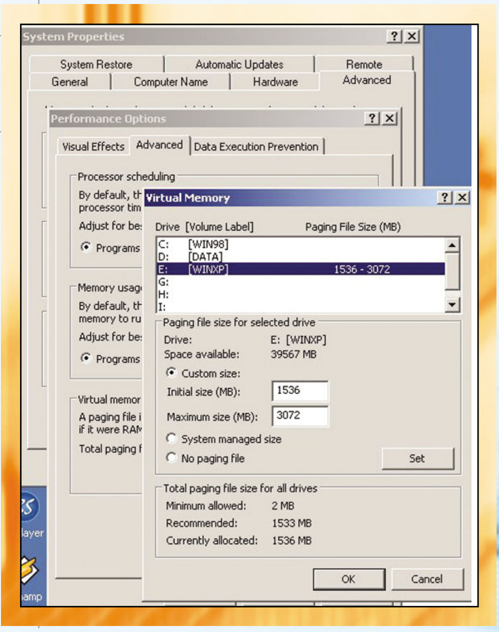
To check to see if your pagefile is fragmented, right-click My Computer and choose Properties. Click the Advanced tab, the Settings button under Performance, the Advanced tab, and then the Change button under Virtual Memory. The Virtual Memory window is quite straightforward: You click a drive letter, set the paging file data, click Set, and reboot. So, for instance, suppose your Windows drive is E:, and you have a data drive of D:. Highlight D:, type values for the Initial Size (MB) and Maximum Size (MB) of the paging file (more on sizing in a moment), and then click Set. Then highlight E: and choose No Paging File, click OK at the warning message, and then click Set. Click OK in all the open dialog boxes and reboot.

How big should the paging file be? We've heard several theories, but the one that makes the most sense to us is to set the Initial Size (MB) to triple the amount of RAM you have (example: 512MB of RAM equals 1,500MB of initial pagefile size). Also, the Maximum Size (MB) should be two to three times the Initial Size (MB). Can you do without a pagefile, even if you have 1GB or 2GB of RAM? Yes, it works, but some applications and games won't work without there being some sort of pagefile, so you might as well set it correctly on the best drive you can.

Drive Defragmenting & Single-Drive Pagefile Tweaks

Microsoft's old file system, FAT32, was especially prone to drive fragmentation over time—so much so that there was a huge selection of commercial disk defragmenters on the market. Generally, the more fragmented your files, the slower your computer works, especially while booting.

Setting the pagefile size and location is easy once you find the right dialog box.



Drive [Volume Label]	Paging File Size (MB)
C: [WIN98]	
D: [DATA]	
E: [WINXP]	1536 - 3072
G:	
H:	
I:	

Paging file size for selected drive
Drive: E: [WINXP]
Space available: 39567 MB
● Custom size:
Initial size (MB): 1536
Maximum size (MB): 3072
○ System managed size
○ No paging file

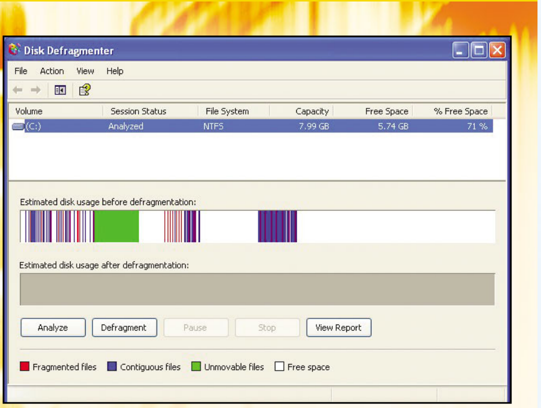
Total paging file size for all drives
Minimum allowed: 2 MB
Recommended: 1533 MB
Currently allocated: 1536 MB

Though it isn't as bad as FAT32, NTFS can and does fragment files, including (occasionally) the pagefile. Because of this, Microsoft includes a disk defragmenter with WinXP, though it is not exactly the best defragmenting tool around. To launch the defragmenter, go to Start, select All Programs, Accessories, System Tools, and Disk Defragmenter. To defragment a drive, which you should consider doing at least once every month or two, select a drive to defragment in the top pane and click Defragment. If you'd like a report of how badly the drive is fragmented, click Analyze first. That's all there is to it, and it's better than nothing.

Unfortunately, the built-in defragmenter can't do anything about fragmented pagefiles, which you would see as a divided green section. Furthermore, we've noticed that the defragmenter doesn't do an exceptionally thorough job defragmenting even normal files, but fortunately, there are some options.

One option is a commercial disk defragmenter such as Executive Software's Diskeeper 9 Professional Edition ($49.50; www.executive.com/defrag/defrag.asp), which can defragment the pagefile and otherwise untouchable system files, along with automated background optimizations while you work. Basic defragmenting is simple: Just click the drive to defragment, click Analyze Selected Volume, and then click Start. After Diskeeper finishes, click Defragment Selected Volume and Start again. To defragment the paging file, click Change A Setting, Set A Boot-Time Defragmentation, highlight your WinXP system drive, and then place check marks next to Defragment The Paging File and Defragment The Master File Table. Finally, click OK and reboot.

If you'd rather not invest in Diskeeper, you can manually create a new, defragmented paging file yourself. Go to the Virtual Memory window, described earlier, and highlight the drive that holds your paging file, choose No Paging File, click Set, OK, and reboot. Once rebooted, run Windows' Disk Defragmenter in order to consolidate your files on the drive, making a large block of empty space. Finally, return to the Virtual Memory window, and create a new paging file as outlined earlier. Create the new file as one contiguous block.



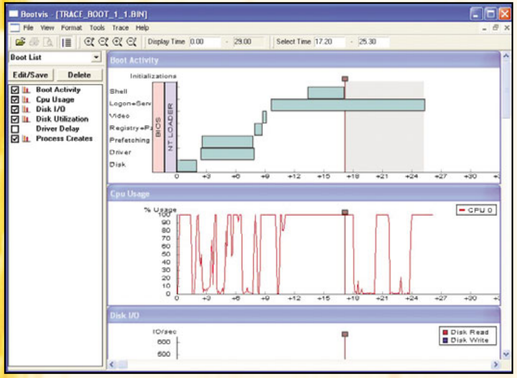
Volume	Session Status	File System	Capacity	Free Space	% Free Space
(C:)	Analyzed	NTFS	7.99 GB	5.74 GB	71 %

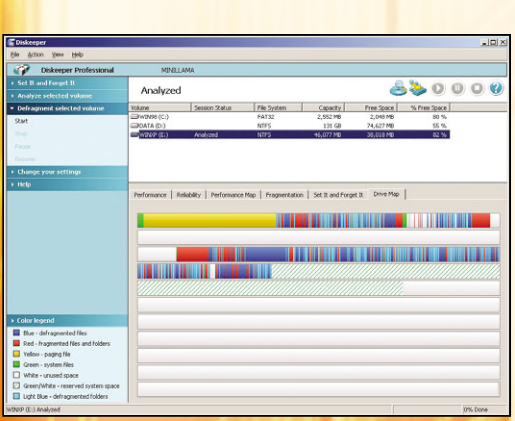
The built-in Disk Defragmenter is as simple as simple can be: Click the drive letter and click Defragment. If you click Analyze, a bar graph appears, representing your files. This large green block is the pagefile, which in this case is fragment-free.

Refresh The Prefetch

One of WinXP's early advantages over other Windows versions was its fast boot time. One of the ways WinXP manages this is to keep track of files your computer accesses at startup and other times, and to store elements of these files together in anticipation of being accessed all at once. In other words, WinXP prefetches these important files so that it can quickly access them later. WinXP is supposed to review the prefetched material every four days and refresh it as needed, but for whatever reason, this doesn't always happen. In fact, in some systems, it never happens.

Microsoft had a tool on its Web site called Bootvis that not only force-refreshed the Prefetch files, but also copied them to the outer tracks of your hard drive, which is actually the fastest place to retrieve files. This tool also created graphs of how much time your computer spent on various tasks during the boot process. Due to reports of unreliability, Microsoft has pulled Bootvis from its servers, but the latest version is widely distributed on the Internet; Google Bootvis to download version 1.3.37.0.





Volume	Session Status	File System	Capacity	Free Space	% Free Space
WIN98 (C:)		FAT32	2,552 MB	2,048 MB	80 %
DATA (D:)		NTFS	131 GB	74,627 MB	55 %
WINXP (E:)	Analyzed	NTFS	46,077 MB	38,018 MB	82 %

Diskeeper has many power options and abilities that WinXP's built-in defragmenter lacks. Diskeeper's default actions are usually right on the money.

The potential for improvement, however, can be dramatic with Bootvis. On one test machine, the boot time improved 25% (from 34 to 25 seconds), while on another it improved it only 2%. Before using Bootvis on your own system, however, you should strongly consider backing things up with Norton Ghost or a similar utility because Microsoft found that enough people were having trouble with Bootvis that it was pulled completely. Furthermore, Windows System Restore has been known to fail to restore a system from a Bootvis problem, so don't rely on it here.

OK, with that warning behind us, download Bootvis from your favorite source, and double-click the installation file to install it. Then go to Start, select All Programs, Microsoft Bootvis, and Bootvis. When Bootvis starts, click the Trace menu and choose Next Boot, click OK, and Reboot Now. Bootvis will restart your computer and keep track of all the files accessed during startup. It also will display a graph of the boot process along with the overall boot time. Write the boot time down. Next, run Bootvis again, and choose Optimize System from the Trace menu. Click Reboot Now when prompted, and let Bootvis do its thing after the reboot. When it's done, run Bootvis one more time, choose Next Boot from the Trace menu again, and reboot as before. When the Bootvis window appears, you can compare the new boot time with the initial boot time. Reports of increased boot times are virtually nonexistent, while reports of improvements abound. Every system is different, but if your system hasn't been prefetching, you could see a huge improvement in boot time.

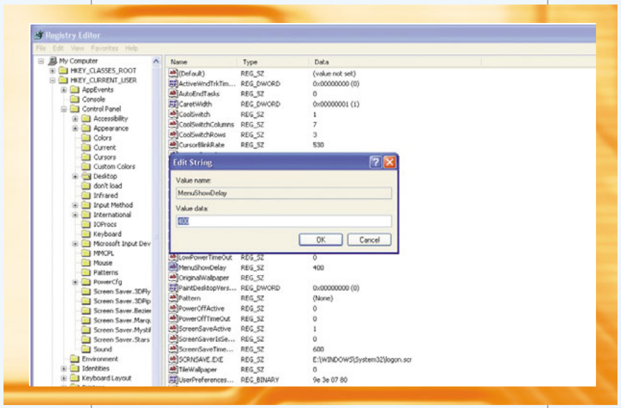
Bootvis displays the elements of the boot process visually, with several charts and graphs. Though it has many tools and options, simply doing a Trace, Optimize, and then another Trace is all you need to potentially improve your boot times.

Tweak Visual Effects

WinXP is certainly the most beautiful version of Windows, complete with shadows, font smoothing, and other visual effects. If you have a fire-breathing PC, you can have all this eye-candy turned on and not notice any slowdown, but if your PC is getting a little old, then selectively turning off some of these effects can make your system feel snappier overall.

Right-click My Computer and choose Properties. Click the Advanced tab and then the Settings button under Performance. What appears is the Visual Effects tab, where you can manually enable or disable 16 special effects such as displaying shadows under the cursor. To enable such features, put a check mark next to the features you want enabled. Some settings won't take effect until a reboot.

Pull-down menus are subject to a delay specified in the Registry, and you can change them with Regedit. To launch Regedit click Start, select Run, type **regedit** in the Open field, and click OK. Regedit works like the standard Windows File Explorer: Click the plus symbol (+) next to a folder to expand it and then the selected folder on the left displays its contents on the right. If you double-click an item on the right, you can change its Registry setting. So, once Regedit is open, click the plus symbol next to the HKEY_CURRENT_USER folder, the plus symbol next to Control Panel, and then click the Desktop folder icon to display its contents. In the right pane, double-click MenuShowDelay to change its value. (This Registry location is referred to as HKEY_CURRENT_USER\CONTROL\PANEL\DESKTOP\MENUSHOWDELAY.) The default Value Data is 400, or 4/10 of a second. Change the Value Data to 0 for the least delay, and click OK.



Name	Type	Data
(Default)	REG_SZ	(value not set)
ActiveWndTrkTim...	REG_DWORD	0x00000000 (0)
AutoEndTasks	REG_SZ	0
CaretWidth	REG_DWORD	0x00000001 (1)
CoolSwitch	REG_SZ	1
CoolSwitchColumns	REG_SZ	7
CoolSwitchRows	REG_SZ	3
CursorBlinkRate	REG_SZ	530
LowPowerTimeOut	REG_SZ	0
MenuShowDelay	REG_SZ	400
OriginalWallpaper	REG_SZ	
PaintDesktopVers...	REG_DWORD	0x00000000 (0)
Pattern	REG_SZ	(None)
PowerOffActive	REG_SZ	0
PowerOffTimeOut	REG_SZ	0
ScreenSaveActive	REG_SZ	1
ScreenSaverIsSe...	REG_SZ	0
ScreenSaveTime...	REG_SZ	600
SCRNSAVE.EXE	REG_SZ	E:\WINDOWS\System32\logon.scr
TileWallpaper	REG_SZ	0
UserPreferences...	REG_BINARY	9e 3e 07 80

Value name: MenuShowDelay

Value data: 400

Editing the Registry values directly can be daunting at first, but this process works just like the Windows File Explorer. Obviously, be careful when typing in new values.

Miscellaneous Speed & Reliability Tweaks

The Internet is full of little tweaks you can make in the Registry to speed things up. Given that we're already in the Registry editor, here are two more tweaks to try:

Open HKEY_LOCAL_MACHINE\SYSTEM\CURRENTCONTROLSET\CONTROL\FILESYSTEM. Right-click Filesystem, select New, and DWORD Value. Rename NewValue#1 on the right-side pane to DisableNTFSLastAccessUpdate. Double-click this new entry, change the Value Data field from 0 to 1, and then click OK. This tells WinXP to stop changing a file's date every time it is accessed, saving a little slice of time hundreds of times an hour.

Running the File Explorer, Desktop, and Taskbar as a separate process is a minor speed boost, plus it tends to increase overall system reliability because if one of them crashes, the others won't. To set this, open HKEY_CURRENT_USER\SOFTWARE\MICROSOFT\WINDOWS\CURRENTVERSION\EXPLORER. Create a new DWORD Value called DesktopProcess, and set its Value Data to 1.

Wrap Things Up

Once you've made these changes, the best way to evaluate their effectiveness is to run those benchmarks and compare the differences. Hopefully, you'll find your system boots faster, runs Windows quicker and more reliably, and is more enjoyable to use. CPU

by Warren Ernst

"The Internet is full of little tweaks you can make in the Registry to speed things up."

BIOS Performance Boosters

YOUR 20-MINUTE CONFIGURATION WORKOUT

Very few people exercise because of the sheer joy it brings them. Nine times out of 10, there's a New Year's resolution or an episode of Dr. Phil behind that half-hour bout with the treadmill. Those folks are gunning for results, and after six months of the same grueling routine, a slimmer waistline or tighter abs hopefully makes the drudgery of exercise worthwhile.

If spending an evening optimizing your system's BIOS sounds like a boring hassle, instead, think of the process as exercise for your PC, shaving seconds from its boot time, improving gaming stamina, and guiding it toward many more months of reliable service. You're even allowed to eat strawberry cheesecake while poring over each page of the users' manual.

DFI LANParty 925X-T2 ($200; DFI; www.dfi.com.tw)
Intel 925X Chipset
Boot time with default BIOS settings: 45 seconds
Boot time with optimized BIOS settings: 42 seconds

Previously unknown to the enthusiast crowd, DFI established credibility with its LANParty series of motherboards. Yes, the boards are flashy and feature several UV-reactive components, but they also incorporate many features that appeal to the power user crowd, such as integrated reset buttons, round cables, and removable onboard audio.

The 925X-T2 represents DFI's uppermost offering for Intel Pentium 4 processors, and it's armed with an impressive BIOS that's full of options for both improving performance and tuning various onboard subsystems. By default, DFI sets the board's BIOS options fairly aggressively, with minimal slowdown. The BIOS detects connected disk drives automatically, even if you choose None from the Standard CMOS Features menu. If you've shed that legacy floppy diskette drive, though, you'll want to disable it under the same menu. Also, change the Halt On setting to No Errors while you're at it.

Press the ESC key and enter the Advanced BIOS Features menu, where you can configure several bootup variables. First, select the CPU Feature menu, where you'll see Delay Prior To Thermal and, if you own a Pentium 4 with NX-bit support (designated by a J in the model name), an option to turn that on or off. By default, Delay Prior To Thermal is set at 16 minutes, which means the board will wait 16 minutes before it activates the processor's integrated thermal control circuit. You'll undoubtedly want protection against automatic shutdown sooner, so change the 16-minute setting to either four or eight minutes. Rather than turning your system off, the control circuit will modulate frequency to maintain an acceptable temperature in the event of unexpected thermal spikes.

Back in the Advanced BIOS Features menu, leave the Virus Warning feature disabled to prevent problems with OS installations. Once you have Windows installed and no longer need to boot from an alternative device, set the First Boot Device to Hard Disk and disable the other boot devices in order to accelerate the startup process. You may opt to disable Boot Up Floppy Seek, especially if you aren't using a 3.5-inch drive. If you'd prefer to see the board's POST status rather than DFI's logo, disable Full Screen LOGO Show and Small Logo (EPA) Show options.

All other options work well at their default settings.

Exit the Advanced BIOS Features menu and select Advanced Chipset Features. The board will attempt to read your RAM modules' SPD chip and set appropriate timings. If you notice that the timings are incorrect, as they tend to be for more aggressive modules, change DRAM Timing Selectable from By SPD to Manual and choose the proper settings. DFI's documentation doesn't expound on the SLP_S4# Assertion Width switch, but changing it doesn't seem to improve performance at all. However, you can tighten chipset timings and improve overall speed if you force the Performance Mode from Turbo to Ultra. Leave the PCI Express Root Port Function, DRAM Data Integrity Mode, and Video BIOS Cacheable options at their default settings, but change System BIOS Cacheable to Disabled. You see, it's not necessary to store the BIOS in L2 cache because Windows XP does not communicate with hardware in that manner. You'll realize better performance by freeing the L2 cache for other purposes.

Once You've Seen One BIOS. . . .

You'll rarely find two motherboard BIOSes that are exactly alike, which is why we'll take the liberty of optimizing a handful of the most popular products spanning several chipsets, including Intel's 925X and 875P chipsets, as well as NVIDIA's nForce4 SLI and nForce2 Ultra 400. Many of each board's settings will also appear in other products employing the same core logic, though they might be named differently or exist under another BIOS menu. Other settings are universal across nearly all motherboards, making it that much easier to follow along. ▲

Press ESC again to return to the main BIOS screen. Select Integrated Peripherals and then OnChip IDE Device. Leave most of the settings at their default positions. Look at the SATA Mode option, though. If you're using an older parallel ATA or SATA 1.0 hard drive, use IDE mode. Newer drives, specifically SATA 1.0a and SATA II devices, employ many of the features incorporated by AHCI, so you'll want to choose the option for enabling NCQ (Native Command Queuing) and hot-swap functionality (especially if you're using multiple hard drives in a RAID array).

Jump back to the previous menu and this time open the Onboard Device property page. Here's your opportunity to conserve resources by disabling integrated peripherals you don't plan to use. Generally, it's a good idea to preserve USB functionality for connecting digital cameras and MP3 players, so leave that one enabled. If you're using an add-in sound card, however, disabling the built-in Azalia Audio option will prevent Windows from detecting both devices. Similarly, if you're only using one Ethernet controller, disable the Onboard PCI LAN, which leaves the PCI Express controller on for better throughput. Do the same for the Onboard 1394 if you aren't going to connect FireWire devices.

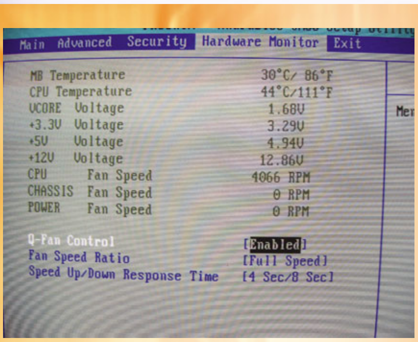
Access the last page under Integrated Peripherals, called SuperIO Device. Turn off the Onboard FDC Controller if there's no floppy drive, as well as the Onboard Serial Port 1. It's also a safe bet to disable the Onboard UART Controller, which will free additional resources that would have been dedicated to the oft-unused infrared header.

Most of the power management settings available through the Power Management Setup on the main BIOS screen enable different forms of power conservation, which can help reduce energy bills in the long run. For example, set HDD Power Down to 15 Minutes if you anticipate leaving the system on for long periods of time without using the hard disk. Enable Video Off In Suspend for similar power savings. Just be aware that when you wake the system up, either through a network access or by moving the mouse, each of those subsystems will take some time to become operational again.

DFI calls the final configuration screen Genie BIOS Setting, but other manufacturers use a title akin to "frequency and voltage adjustment." The Genie BIOS Setting screen is where you tweak bus speeds and voltage levels in a bid to coax extra speed from your processor, motherboard, and memory. Remember that any manual manipulation of processor speeds may void an associated warranty, and increasing power levels is likely to cause damage. But if you're comfortable with the inherent risks of tweaking, change the CPU Operating Speed from Default to Manual. Notice that several new options are available, the first of which is called Ext. Clock (CPU/PCI). The Ext. Clock (CPU/PCI) option's default speed of 200MHz is multiplied by a preset number to yield the processor's final operating frequency. A 3.4GHz Pentium 4's multiplier is set to 17X, so every 1MHz increment in bus speed overclocks the processor by an extra 17MHz. You can use that clock setting to gradually increase performance, taking special care not to sacrifice overall system stability. Similarly, augmenting the PCI Express Frequency setting will improve throughput over the PCI-E bus.

Setting voltages is a little trickier. By default, the 925X-T2 runs processor, memory, and the northbridge all at their standard settings (for more on your Pentium 4's default voltage, check (www.intel.com/support/processors/pentium4/sb/cs-008016.htm). However, there is a massive range of choices for processor voltage between 0.8375 and 1.95V to use for improving stability at overclocked speeds. The same goes for memory and northbridge voltages, which can all be used to improve stability but are all also somewhat risky.

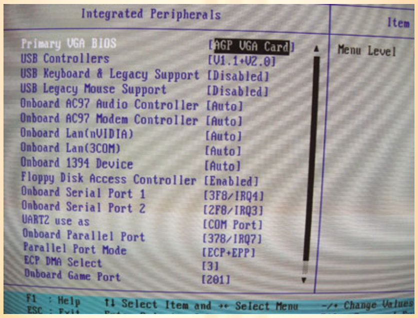
ASUS A7N8X Deluxe ($90; ASUS; usa.asus.com)
NVIDIA nForce2 Ultra 400 Chipset
Boot time with default BIOS settings: 47 seconds
Boot time with optimized BIOS settings: 44 seconds



```
MB Temperature                     30°C/ 86°F
CPU Temperature                    44°C/111°F
VCORE  Voltage                      1.68V
+3.3V  Voltage                      3.29V
+5V    Voltage                      4.94V
+12V   Voltage                     12.86V
CPU       Fan Speed               4066 RPM
CHASSIS   Fan Speed                  0 RPM
POWER     Fan Speed                  0 RPM

Q-Fan Control                    [Enabled]
Fan Speed Ratio                  [Full Speed]
Speed Up/Down Response Time      [4 Sec/8 Sec]
```

The A7N8X Deluxe's hardware monitoring screen keeps tabs of fan speeds, voltages, and temperatures.



```
Primary VGA BIOS                   [AGP VGA Card]
USB Controllers                    [V1.1+V2.0]
USB Keyboard & Legacy Support      [Disabled]
USB Legacy Mouse Support           [Disabled]
Onboard AC97 Audio Controller      [Auto]
Onboard AC97 Modem Controller      [Auto]
Onboard Lan(nVIDIA)                [Auto]
Onboard Lan(3COM)                  [Auto]
Onboard 1394 Device                [Auto]
Floppy Disk Access Controller      [Enabled]
Onboard Serial Port 1              [3F8/IRQ4]
Onboard Serial Port 2              [2F8/IRQ3]
UART2 use as                       [COM Port]
Onboard Parallel Port              [378/IRQ7]
Parallel Port Mode                 [ECP+EPP]
ECP DMA Select                     [3]
Onboard Game Port                  [201]
```

Disable unused peripherals in the A7N8X's BIOS in order to accelerate boot speeds.

Arguably the most popular nForce2 board available, ASUS' A7N8X Deluxe offers a plethora of functionality, a host of extremely useful integrated hardware features, and tuning options galore. The A7N8X is very much an enthusiast product, and ASUS configures its BIOS, by default, to reflect that pedigree. You'll notice that the layout is significantly different from many other motherboards, due to the BIOS vendor. Most of the options are comparable, though.

On the principal BIOS page, for instance, you can set time options, detect disk drives, and disable the floppy drive. Move over to the next menu, titled Advanced, for a list of submenus and choose Advanced BIOS Features. Your goals here are to en-able all relevant caches, minimize boot times by selecting your hard drive as the First Boot Device, and disable other devices so that the BIOS won't stall on them. Disable the Speech POST Reporter and Full Screen LOGO Show, as well. Leave the APIC Mode enabled to allow more IRQs and faster interrupt handling.

Cycle back to the Advanced tab and select Advanced Chipset Features. This is where you'll find the A7N8X's overclocking options, of which there are many. To begin, set the CPU External Freq. (MHz), which is the frontside bus speed that's automatically placed at 100MHz to protect your Athlon XP. The last letter in each processor's part number indicates its rated bus speed (C is equivalent to 133MHz, D represents 166MHz, and E equals 200MHz). So, you can either choose one of those nice round numbers or change the System Performance option from Optimal to User Defined. Doing so unlocks 1MHz bus speed increments from 100 to 300MHz, facilitating the utmost in customization and negating the need to change CPU Interface from its stock setting of Optimal. Bear in mind that there are plenty of voltage settings farther down the same page. If you're having a difficult time realizing certain overclocking goals, it often helps to apply more voltage. The clear caveat is heightened risk to the affected components.

If you use premium memory, it may be possible to improve the Memory Timings option beyond Optimal. If you do advance this option past Optimal, reduce timings gradually in order to verify system stability. Leave both Spread Spectrum settings disabled whenever possible unless you've encountered problems with EMI (electromagnetic interference). Be discerning though, because turning those features on may reduce the flexibility of your tuning options. In addition, keep the System BIOS Cacheable and Video RAM Cacheable settings disabled to preserve the Athlon XP's L2 cache for other tasks. However, enable AGP Fast Write Capability and AGP 8x Support. They'll both improve the performance of compatible AGP graphics cards by accelerating memory write transactions and bolstering overall bandwidth.

As mentioned, the A7N8X is rife with connectivity options. Disable any options you don't use in the BIOS to save you the trouble of finding drivers for an unnecessary component and to free system resources. You can find settings for onboard devices in the Integrated Peripherals submenu under Advanced Chipset Features. Assuming you've added an AGP graphics card, change the Primary VGA BIOS to AGP VGA Card. Then, cycle through the various peripherals and turn off the second Ethernet controller or the serial ports. You'll probably want to keep the USB controllers, as well as the onboard SoundStorm audio controller, too.

Most of the other features impose far less influence over performance and reliability. Power management, again, is a great way to reduce your system's thermal output and power consumption. But remember that deactivated components have to power back up and will consequentially cause a small delay in usability. The A7N8X's only other important BIOS feature is Q-Fan, which controls a processor fan to either provide better cooling or quieter operation depending on how you have it configured.

ASUS P4C800-E Deluxe ($180; ASUS; usa.asus.com)
Intel 875P Chipset
Boot time with default BIOS settings: 50 seconds
Boot time with optimized BIOS settings: 37 seconds

Similar to its A7N8X Deluxe, ASUS' P4C800-E deserves respect for delivering great performance and a useful feature set. Centering on Intel's 875P chipset, the board offers a couple of settings not found on competing core logic. Mainly, PAT (Performance Acceleration Technology) reduces latency within the chipset and hastens memory transactions. Moreover, native SATA support means you won't need a floppy drive for driver installations during Windows setup.

In order to tinker with the board's hard drive controller, select IDE Configuration from the main BIOS screen. If you're running Windows 2000 or WinXP, set the Onboard IDE Operate Mode to Enhanced Mode. Should you decide to add a pair of similar SATA drives in a RAID 0 array, choose either S-ATA or P-ATA+S-ATA under the Enhanced Mode Support On menu. Then choose Yes when prompted with Configure S-ATA As RAID.

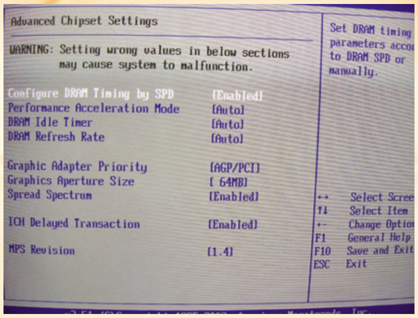
Return to the first BIOS screen by pressing the ESC key and move to the Advanced menu. Select JumperFree Configuration and you'll see a handful of options related to performance. If you aren't comfortable making manual tweaks to clock frequencies, the AI Overclock Tuner will handle those adjustments automatically using percentages. For processors with unlocked multipliers (generally only engineering samples), the CPU Ratio field facilitates specific entries. Finally, set the Performance Mode to Turbo, checking for stability along the way. If you're using good memory modules, you should notice better performance through tighter timings.

Exit the JumperFree Configuration page and select the Chipset submenu (there's little significance in the CPU Configuration menu, so we'll skip it). By default, you'll see that the BIOS configures your memory modules according to their onboard SPD chip. Should you decide to deviate from those settings, change Configure DRAM Timing By SPD to Disabled, thereby exposing advanced timings. Performance Acceleration Mode, one of the 875P chipset's hallmark features, should sit comfortably at Enabled. The next option, DRAM Idle Timer, specifies the number of idle cycles that are allowed before open memory pages are closed and precharged. Refreshing memory pages reduces real-world memory bandwidth, so it pays to set the idle timer high for general computing machines. The Infinite setting forces the memory controller to never prematurely precharge open pages, maximizing bandwidth. Along the same lines, increasing the DRAM Refresh Rate also helps maximize memory bandwidth. If the refresh is postponed too long, however, instability will surface. Test the 64 uSec setting first and see if performance improves or you run into problems. Leave ICH Delayed Transaction set to Enabled, as well, activating temporary storage buffers for ICH transactions.

Now, open the Onboard Devices Configuration page under the Advanced tab. Here's where you can shave the most time from your startup process, especially if you're a light user of integrated controllers. Systems with fewer than two SATA devices don't need the Promise PDC20378 controller. Turn that controller off in the BIOS by selecting Disable to eliminate the lengthy seek routine that transpires during every bootup. Also disable serial, parallel, and game ports if you're not using them. Of course, feel free to replace the AC'97 controller with an add-in sound card and turn off the IEEE 1394 controller, as well.

You do not need to tweak any of the other Advanced submenus. And, if you aren't comfortable with your computer talking to you, open the Speech Configuration page and change Speech Post Reporter to Disabled.

Move to the Boot menu and select Boot Device Priority. As with the other motherboards, once your OS is installed and you don't anticipate booting to alternative devices, set your hard drive as the first Boot Device by selecting it in the corresponding drop-down menu and disable the second and third choices in the same manner. Return to the Boot menu screen and this time choose Boot Settings Configuration. Turn off the Full Screen Logo if you'd like to follow the POST process and turn off the Hit 'DEL' Message Display option. You're a power user, after all. Of course you know which key invokes the BIOS, right?



```
Advanced Chipset Settings

WARNING: Setting wrong values in below sections
         may cause system to malfunction.

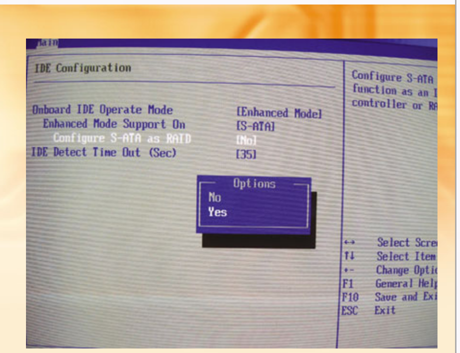
Configure DRAM Timing by SPD          [Enabled]
Performance Acceleration Mode         [Auto]
DRAM Idle Timer                       [Auto]
DRAM Refresh Rate                     [Auto]

Graphic Adapter Priority              [AGP/PCI]
Graphics Aperture Size                [ 64MB]
Spread Spectrum                       [Enabled]

ICH Delayed Transaction               [Enabled]

MPS Revision                          [1.4]
```

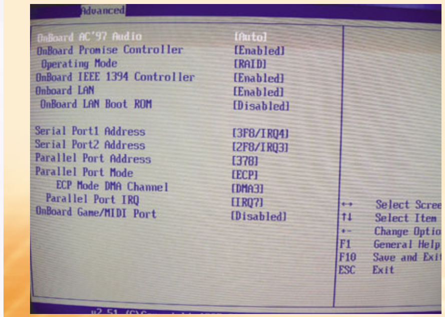
ASUS' P4C800-E requires that you first enable custom DRAM timings before they become visible.



```
IDE Configuration

Onboard IDE Operate Mode              [Enhanced Mode]
  Enhanced Mode Support On            [S-ATA]
    Configure S-ATA as RAID           [No]
IDE Detect Time Out (Sec)             [35]
```

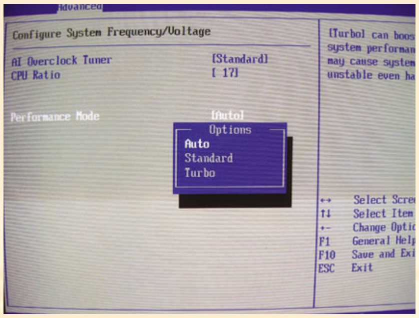
Enabling RAID functionality on the P4C800-E is as easy as setting a BIOS switch.



```
OnBoard AC'97 Audio                   [Auto]
OnBoard Promise Controller            [Enabled]
 Operating Mode                       [RAID]
OnBoard IEEE 1394 Controller          [Enabled]
Onboard LAN                           [Enabled]
 OnBoard LAN Boot ROM                 [Disabled]

Serial Port1 Address                  [3F8/IRQ4]
Serial Port2 Address                  [2F8/IRQ3]
Parallel Port Address                 [378]
Parallel Port Mode                    [ECP]
   ECP Mode DMA Channel               [DMA3]
  Parallel Port IRQ                   [IRQ7]
OnBoard Game/MIDI Port                [Disabled]
```

Unused peripherals, specifically the onboard RAID controller, will really slow down the P4C800's boot process.



```
Configure System Frequency/Voltage

AI Overclock Tuner                    [Standard]
CPU Ratio                             [ 17]


Performance Mode                      [Auto]
```

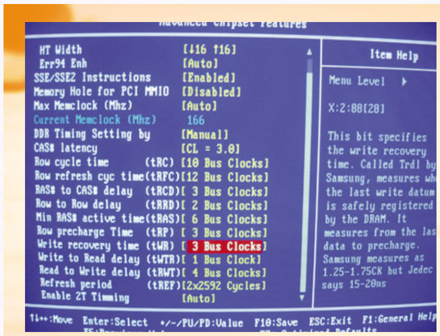
Turbo mode purportedly tightens chipset timings on ASUS' P4C800-R motherboard.

Just remember to save your changes before exiting, champ.

GIGABYTE K8NXP-SLI ($290; GIGABYTE; www.giga-byte.com)
NVIDIA nForce4 SLI Chipset
Boot time with default BIOS settings: 61 seconds
Boot time with optimized BIOS settings: 34 seconds

If the latest and greatest whets your appetite, GIGABYTE's K8NXP-SLI is absolutely cutting edge. But because the board comes with so many ancillary components, it also takes the longest to start up. Fortunately, the board is very receptive to adjustment and, with the right set of options, you can configure it to boot faster than any other motherboard in our roundup.

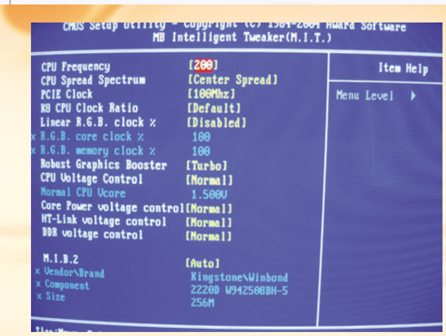
Begin with the Standard CMOS Menu, setting your time and selecting whether you'll use a floppy drive. The BIOS should automatically detect connected disk drives, simplifying configuration. Go back to the initial BIOS screen and choose Advanced BIOS Features this time. Make sure your hard drive is the first boot device, disable the others, and set Init Display First to PEG, providing that you're using a single PCI-E graphics card.



```
HT Width                       [↓16 ↑16]           Item Help
Err94 Enh                      [Auto]
SSE/SSE2 Instructions          [Enabled]           Menu Level  ▶
Memory Hole for PCI MMIO       [Disabled]
Max Memclock (Mhz)             [Auto]              X:2:88[28]
Current Memclock (Mhz)          166
DDR Timing Setting by          [Manual]            This bit specifies
CAS# latency                   [CL = 3.0]          the write recovery
Row cycle time          (tRC)  [10 Bus Clocks]     time. Called Trdl by
Row refresh cyc time(tRFC)[12 Bus Clocks]          Samsung, measures wh
RAS# to CAS# delay   (tRCD)[ 3 Bus Clocks]         the last write datum
Row to Row delay     (tRRD)[ 2 Bus Clocks]         is safely registered
Min RAS# active time(tRAS)[ 6 Bus Clocks]          by the DRAM. It
Row precharge Time    (tRP) [ 3 Bus Clocks]        measures from the las
Write recovery time  (tWR) [ 3 Bus Clocks]         data to precharge.
Write to Read delay  (tWTR)[ 1 Bus Clock]          Samsung measures as
Read to Write delay  (tRWT)[ 4 Bus Clocks]         1.25-1.75CK but Jedec
Refresh period       (tREF)[2x2592 Cycles]         says 15-20ns
Enable 2T Timing           [Auto]

↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
```

The K8NXP-SLI offers a series of advanced settings that appear when you hit CTRL-F1.

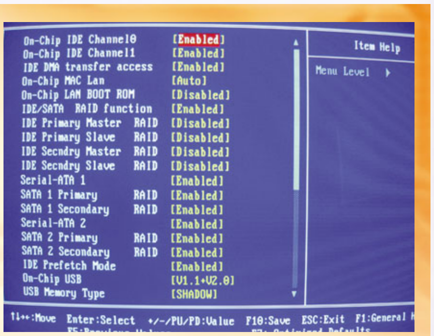


```
                 MB Intelligent Tweaker(M.I.T.)

CPU Frequency                  [200]               Item Help
CPU Spread Spectrum            [Center Spread]
PCIE Clock                     [100Mhz]            Menu Level  ▶
K8 CPU Clock Ratio             [Default]
Linear R.G.B. clock %          [Disabled]
x R.G.B. core clock %           100
x R.G.B. memory clock %         100
Robust Graphics Booster        [Turbo]
CPU Voltage Control            [Normal]
Normal CPU Vcore                1.500V
Core Power voltage control[Normal]
HT-Link voltage control        [Normal]
DDR voltage control            [Normal]

M.I.B.2                        [Auto]
x Vendor\Brand                  Kingstone\Winbond
x Component                     2220D W942508BH-5
x Size                          256M
```

GIGABYTE's MB Intelligent Tweaker (M.I.T.) sets FSB speed, PCI Express speed, voltage control, and advanced memory adjustments.



```
On-Chip IDE Channel0           [Enabled]           Item Help
On-Chip IDE Channel1           [Enabled]
IDE DMA transfer access        [Enabled]           Menu Level  ▶
On-Chip MAC Lan                [Auto]
On-Chip LAN BOOT ROM           [Disabled]
IDE/SATA  RAID function        [Enabled]
IDE Primary Master   RAID      [Disabled]
IDE Primary Slave    RAID      [Disabled]
IDE Secndry Master   RAID      [Disabled]
IDE Secndry Slave    RAID      [Disabled]
Serial-ATA 1                   [Enabled]
SATA 1 Primary       RAID      [Enabled]
SATA 1 Secondary     RAID      [Enabled]
Serial-ATA 2                   [Enabled]
SATA 2 Primary       RAID      [Enabled]
SATA 2 Secondary     RAID      [Enabled]
IDE Prefetch Mode              [Enabled]
On-Chip USB                    [V1.1+V2.0]
USB Memory Type                [SHADOW]

↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General H
```

Disable unused SATA channels in GIGABYTE's peripheral setup screen.

Next, open the Integrated Peripherals page. Note that it's not even possible to use a single SATA hard drive with the K8NXP-SLI's default BIOS settings unless you first turn off the IDE/SATA RAID Function. If you're using fewer than four SATA devices, you can also disable the SATA RAID-5 Function, which bypasses Silicon Image's onboard SATA controller. Moreover, if you're using fewer than three devices, it's possible to shut down one of the nForce4's two integrated SATA controllers, accelerating bootup even more. On the other hand, if it's RAID functionality that you're after, keep the RAID function enabled and add drives from the IDE and SATA ports to your array by turning each channel on or off. Continue through the other features and disable extra Ethernet controllers and unused ports.

Return to the main BIOS page and choose MB Intelligent Tweaker (M.I.T.), the name given to GIGABYTE's overclocking toolset. The CPU Frequency setting controls the motherboard's bus speed, which operates at 200MHz by default. AMD's Athlon 64 technically doesn't have a frontside bus because the processor and memory controller are both built onto one die. Thus, increasing the processor bus speed actually accelerates the board's HyperTransport bus. It's also possible to independently overclock the PCI-E bus in small, 1MHz increments through the PCIE Clock setting. The Robust Graphics Booster option focuses specifically on bolstering PCI-E graphics performance by improving memory performance according to three different settings: Turbo (for the most aggressive operation, though you won't see an improvement in boot times), Fast (for more conservative performance), and Auto (to let the K8NXP-SLI determine the optimal choice for your configuration). Finally, disable CPU Spread Spectrum unless you're encountering a specific problem with EMI.

Perhaps that seems like an abbreviated configuration process, and indeed, GIGABYTE hides the more advanced settings on some of its motherboards to simplify setup. Press CTRL-F1 to expose Advanced Chipset Features on the main BIOS page. Most of the options, such as HT Frequency, HT Width, and SSE/SSE2 Instructions, are already optimized for peak performance. However, by changing the DDR Timing Setting By selection from Auto to Manual, you'll be granted access to a full page of configurable memory timings.

In Retrospect

In stock trim, most motherboards are set up to offer broad compatibility and optimal performance. They simply aren't fine-tuned for raw speed and a quick bootup process. In fact, it's often the fastest platforms that take the longest to start because of their expansive feature sets and thorough hardware detection routines. But if you take time to disable unused onboard components, optimize timings on quality memory modules, and tweak processor frequencies, you can expect plenty of real-world results that translate to a better overall computing experience, all without ever running a mile or doing push-ups.

by Chris Angelini

How easy should recording a DVD be?
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The HUMAX DVD Recorder with TiVo® service.

The HUMAX DVD Recorder makes it easy to control television and create DVDs. That's because the same great TiVo® service that lets you find and store your favorite programs, guides you through the process of burning a DVD. And don't worry about shelf space. This little box takes the place of three components. It's an 80-hour TiVo Series2™ DVR, an advanced DVD player, and an easy-to-use DVD Recorder. So search for shows and save them on the hard drive or burn them right to a DVD. With the HUMAX DVD Recorder, your shows can go wherever you go, easy.

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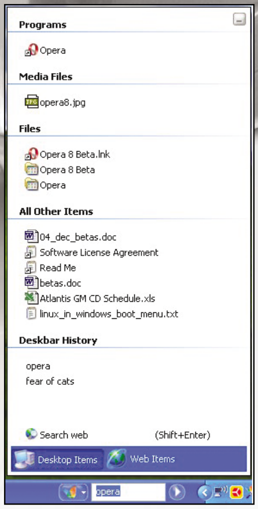
by Warren Ernst

The Bleeding Edge Of Software

Inside The World Of Betas

MSN Toolbar Suite Beta



Programs

Opera

Media Files

opera8.jpg

Files

Opera 8 Beta.lnk
Opera 8 Beta
Opera

All Other Items

04_dec_betas.doc
Software License Agreement
Read Me
betas.doc
Atlantis GM CD Schedule.xls
linux_in_windows_boot_menu.txt

Deskbar History

opera
fear of cats

Official product name: MSN Toolbar Suite Beta
Version # previewed: Beta
Publisher: Microsoft
Developer and URL: Microsoft; beta.toolbar.msn.com
ETA: Q2 2005
Why you should care: An integrated, private way to index your local files.

Microsoft can be Borg-like in its assimilation of disparate tools and technologies, but the results can often be impressive. Exhibit A: the beta version of the MSN Toolbar Suite, with an emphasis on "suite." In addition to typical toolbar features, the MSN Toolbar now includes Desktop file searching, which is similar to Google Desktop Search's app. There are enough differences between the two, however, to conclude that one isn't merely a copy of the other.

The Toolbar Suite includes a pop-up blocker, automatic form-filler with optional credit card number recorder, a useful word highlighter, and direct links to Messenger, Hotmail, and the MSN Spaces blogging service. There's also an automatic password vault in which you enter a master password, when prompted, and the toolbar enters the unique password of the Web site you're trying to access.

A new feature to the suite consists of local file searching. The program performs an index of most (but not all) files and email on your local hard drive in the background (assuming your email app is Outlook or Outlook Express). Search fields appear in Outlook, Internet Explorer, and the Taskbar. Click a resulting file, and it opens in its native viewer.

Microsoft has taken a decidedly different approach to file searching than Google. Perhaps the best way to approach Microsoft's application is to directly compare it to Google Desktop Search (see below). ▲

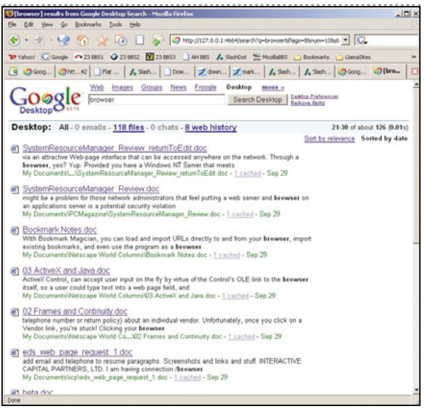
Google Desktop Search Beta

Google has taken a more direct approach for searching local files than Microsoft. Desktop Search offers a simple UI and can search within fewer file types than MS' app or others, such as Copernic Desktop Search, Blinkx, or X1. Paradoxically, Google offers somewhat more configurability than MSN Desktop Search.

DS' indexer scans your files during periods of inactivity. Unlike MS' app, you can view the status of indexing at all times. Indexing includes your entire IE browsing history and MS Office files on your system, including those other users create. These last two features have raised the eyebrows of some privacy advocates. If you have files you don't want others to see, you can make adjustments in the Preferences menu. Microsoft's Desktop search limits its index to only those files the current user owns, skipping the browser history entirely.

Searching with DS is simple. Just open a browser and point it at Google, where you'll find a Desktop category. Click the Desktop link, type your search query, and your local files and email will appear as if they're Google Web results complete with a summary for each. Click the link, and the file or email opens. DS searches for email, chat logs, browser history, bookmarks, and personal files all at once, which are displayed in the results. This can result in hundreds of hits.

Microsoft and Google will be major players in this field, and given that if both apps remain free for some time, we'll be the winners in this war. ▲



[browser] results from Google Desktop Search - Mozilla Firefox

http://127.0.0.1:4664/search?q=browser&flags=8&num=10&st-

Desktop: All - 0 emails - 118 files - 0 chats - 8 web history   21-30 of about 126 (0.01s)

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browser
Search Desktop
Desktop Preferences
Remove Items
Done

Official product name: Google Desktop Search
Version # previewed: Beta
Publisher: Google
Developer and URL: Google; desktop.google.com
ETA: Q2 2005
Why you should care: A simple, quick way to search a computer.

Send Us Your Betas: Know of software in the beta stage that's deserving of some attention? Send your prospects to bleedingedge@cpumag.com. For more betas, subscribers can go to www.cpumag.com/cpumar05/betas.

UP TO SPEED

Upgrades That'll Keep You Humming Along

For fans of the PDF format, there's a new, faster Adobe Reader, plus an update of the previous version. Half-Life 2 and Radeon owners will want the new Catalyst drivers, and those who nabbed an Audigy 4 Pro card for Christmas may have noticed a few bugs with the remote control, which Creative has fixed.

Upgrades

Adobe Reader 6.0.3 Update

Fixes prevent malicious code from running in embedded Flash media and plug holes in embedded PNG images that can be exploited. The update requires having already upgraded to 6.0.2.

Get it at: www.adobe.com

Adobe Reader 7.0

To upgrade rather than update, Adobe says the new Reader version offers better performance in launching pages and in zooms and pans, displays and shares Adobe Photoshop Album slideshows, and lets you complete and submit forms in PDF format.

Get it at: www.adobe.com

AMD N-Bench 3.1

Designed by AMD, this CPU benchmarking program displays dazzling 3D graphics and measures CPU performance. It isn't available directly from AMD but at download sites such as MajorGeeks.com.

Get it at: www.majorgeeks.com

BitTorrent for Windows 3.9.0 (4.0 Beta)

This popular protocol is faster, has a new UI, and smarter recovery for interrupted downloads.

Get it at: www.bittorrent.com

BlindWrite 5.2.6

The disc-cloning software fixes a problem with audio CD backups. A previous 5.2.5 update improved write speeds.

Get it at: www.vso-software.com

Google Desktop Search 121004

This update should be automatic for current users. It plugs a security hole that DS opened when showing Desktop and Web search results on the same page.

Get it at: www.google.com

Morpheus 4.6.1.298

The infamous P2P client claims enhanced handling of CPUs and increased overall stability.

Get it at: www.morpheus.com

Mozilla 1.7.5

For those who prefer the original Mozilla browser over Firefox, this upgrade adds support for NPRuntime (an extension of the Netscape Plugin API), improvements in IE compatibility, and numerous bug fixes.

Get it at: www.mozilla.org

OpenOffice 2.0 Snapshot Build

This is a preview version of the upcoming major upgrade. The 2.0 version will offer better file compatibility with Office and such features as creating tables within a table cell, word counts of selected text, more keyboard shortcuts, better object positioning within a text flow, and a redesigned toolbar.

Get it at: www.openoffice.org

Skype 1.1.0.47 beta

This mid-December update includes major bug fixes and additions such as chats with up to 50 users, new contact lists and importing, better file transfers, and squashed bugs.

Get it at: www.skype.com

SpeedFan 4.19

This freeware tool for monitoring fan speeds, temps, and motherboard voltages fixes a bug involving properly reading some onboard sensors. It is also fixes earlier problems with identifying S.M.A.R.T. and AAM on hard drives.

Get it at: www.almico.com/speedfan.php

Driver Bay

ATI Catalyst 4.12

The latest drivers give Half-Life 2 players up to a 20% performance boost in some game sequences, as well as improvements in other Direct3D and OpenGL games. The Control Center now has error reporting, and the driver suite includes Overdrive 3.0, a safe overclocking tool for Radeon X850 XT cards.

Get it at: www.ati.com

Creative Audigy 4 Pro 3.00.55

The updated drivers and software for Creative's newest sound card improve the remote control functionality. Fixes include properly displaying video playback options in the Entertainment Center menu, displaying subtitles, and enabling the Stop/Eject button.

Get it at: www.creative.com

Creative Zen Portable Media Player Firmware Update 1.03

This upgrade improves power usage, streamlines switching out of Radio mode, and adds Chinese language support. Fixes include improved video playback, better synchronization of DRM-protected media, and better stability of USB connection speeds.

Get it at: www.creative.com

NVIDIA DVD Decoder 1.00.67s

This MPEG-2 codec from NVIDIA lets you play DVDs in Windows Media Player after purchasing a $19.95 activation key. This version enables PureVideo technology in GeForce 6 series GPUs for better video rendering, plus adds better overall compatibility and specific extensions to work with Media Center 2005's control panel.

Get it at: www.nvidia.com

by Steve Smith

2005's Antivirus Apps Unveiled

The Battle Isn't Just Against Viruses Anymore

Have there been computer viruses as long as there have been PCs? Maybe not, but it sure feels like it. The breadth of threats against PC users has exploded in the last few years, too. It's not just viruses anymore; it is network worms, spyware, porn dialers, and a flood of spam that never seems to get any smaller. Many of these problems go hand in hand. The vast majority of spam, for instance, comes from computers infiltrated by viruses that turn the PC into a zombie mail sender. What's to be done?

We are hoping the newest wave of antivirus software can help. Many of the programs revised for 2005 see all these threats as being essentially the same thing in different forms, such as classifying spyware as a virus and treating it as such. It's frankly baffling why this didn't happen sooner; maybe because antivirus software makers feared possible legal repercussions. However, the vast majority of users consider spyware to be just as bad as any virus out there. (True, some programs that bundle with adware will break if the adware is removed, but most people will opt for genuinely free software rather than the ad-supported variety if they have a choice.)

In this roundup of antivirus products, we've examined five programs that seem to reflect the gamut of what is available, from such all-in-one solutions as Symantec Norton AntiVirus 2005 to such simple solutions as F-Secure Antivirus. Even the simplest programs we looked at scan email, and some programs now defend against attachments sent via instant messenger applications, as well.

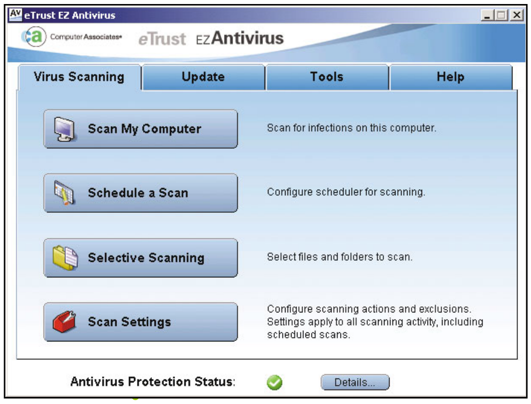
All the products here (with the exception of F-Secure) were tested and certified through ICSA Labs (www.icsalabs.com), an independent testing authority for security products. Thus, there's very little difference among the applications in terms of which threats they address or how comprehensive their antivirus dictionaries are. If you're unsure about which program is for you, choose by your needs. People who don't need as comprehensive a solution can opt for one of the simpler programs, such as eTrust EZ Antivirus. Those who want total defense can pick a higher-end product, such as PC-Cillin. You can also download all the programs listed here as 15- or 30-day trial editions.

Computer Associates eTrust EZ Antivirus

eTrust EZ Antivirus, like F-Secure, is simple and relatively unobtrusive. The program is definitely not as comprehensive as some of the other packages here, but for basic protection it's more than adequate, and the price is right.

The program covers the most essential areas for antivirus protection: live, scheduled, and on-demand file scanning; in- and outbound email checking; and scanning specified folders. There is no protection against spyware (another CA product, PestPatrol [$40], handles this), and no proactive network protection in the style of Norton AntiVirus. This is essentially a no-nonsense antivirus product. You can't edit many of the functions in detail, unfortunately. For example, it's not possible to set the ports used for scanning email.

The program doesn't use profiles or profile settings, but it does let you edit or disable the available options, such as controlling whether to clean or quarantine when viruses are found in various actions. The app also scans against LAN activity (machine-to-machine copying) and files copied from removable drives. If you want CA's support team to help, the program can generate a detailed system report and forward it to CA for analysis.



Scan for infections on this computer.

Configure scheduler for scanning.

Select files and folders to scan.

Configure scanning actions and exclusions. Settings apply to all scanning activity, including scheduled scans.

eTrust EZ Antivirus 7.1
$30
Computer Associates
www.ca.com

There aren't a lot of little touches here, but the few that exist are nice. The program's System Tray icon has a Snooze feature to temporarily disable virus scanning, which is handy if you need to copy files from a known, good removable drive without slowing things down, for example. The Computer Associates Web site also delivers breaking virus alerts through an RSS feed. That's a feature we wish other manufacturers would adopt.

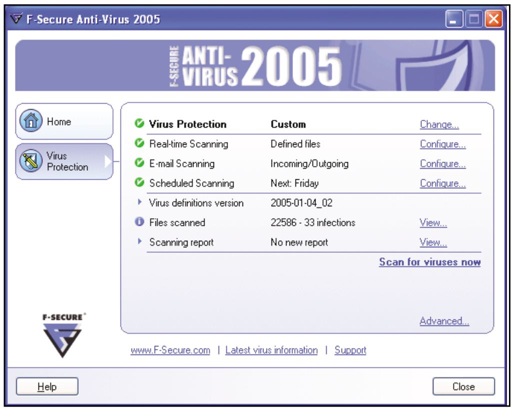
F-Secure Anti-Virus 2005

F-Secure's antivirus product is as straightforward and as simple a package as you're likely to get. It scans for viruses, period. There's no spyware checking, no firewall, and very few other bonus features. The price is more than the more full-featured and robust PC-Cillin, however, which makes it a far less appealing choice. It was also the one product in this roundup that wasn't ICSA certified.

F-Secure comes with three built-in virus protection levels: Off (all antivirus scanning is disabled), Normal (heuristic, memory, and boot-time scanning enabled), and high (all real-time protections are also enabled, including inbound and outbound email). The user can also create custom protection profiles to scan specific types of files, to include/exclude looking inside compressed files, to control how email scanning is handled (you can even define which specific ports are used for email traffic), when to get updates, when to perform background scans, and more.

The program has also been designed to play nicely with other applications. You can configure F-Secure to suspend scanning when an application on a predefined list is running, such as if you're defragmenting a drive and don't want virus checking to slow that down. If you're on a dial-up link or slow network, you can set the program to only use the network at given times, when a network link exists, or in such a way that priority is given to networking for other applications. News of new virus threats triggers a pop-up balloon, which also tells you if your current virus dictionary will protect against it.

There are a few limitations to how F-Secure performs virus protection. For one, it doesn't trap viruses that are copied in from shared drives across a LAN. (PC-Cillin does this quite aggressively, going so far as to offer to stop network traffic if it detects a virus.) F-Secure also doesn't scan for spyware, which is something that is becoming less of an option for antivirus products and more a standard-issue component.



Virus Protection	**Custom**	Change...
Real-time Scanning	Defined files	Configure...
E-mail Scanning	Incoming/Outgoing	Configure...
Scheduled Scanning	Next: Friday	Configure...
Virus definitions version	2005-01-04_02	
Files scanned	22586 - 33 infections	View...
Scanning report	No new report	View...

Scan for viruses now

Advanced...

www.F-Secure.com | Latest virus information | Support

Anti-Virus 2005
$64
F-Secure
www.fsecure.com

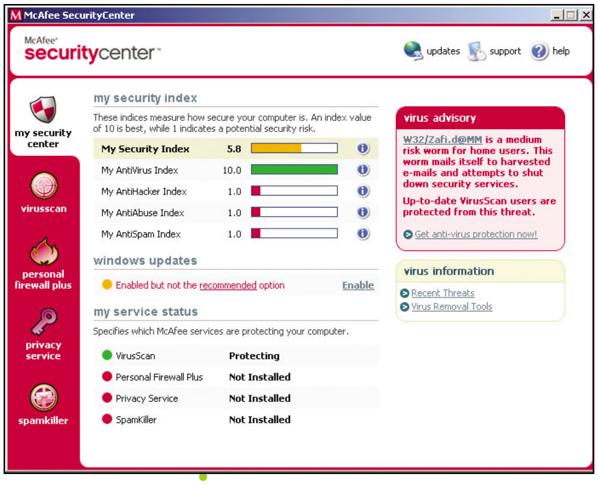
McAfee VirusScan

Like Symantec, McAfee is one of the biggest names in antivirus protection. McAfee's VirusScan is designed to be part of its Security Center suite of products, to which you can add firewall, antispam, or online privacy-management packages. VirusScan isn't as complex and comprehensive as Norton AntiVirus, but that may be because some of the things you'll find in NAV (such as worm protection) you'll find in McAfee's firewall product.

VirusScan focuses on the basics: scanning files and email attachments and protecting against obvious threats such as scripts and email worms. Script and worm blocking doesn't seem to be done by trapping all network traffic but by analyzing email traffic because most scripts and worms spread through email. This is probably a more efficient approach than using network heuristics to trap everything that goes across the wire, but it's also that much less comprehensive.

VirusScan has a Rescue Disk function to aid system recovery in the event of a virus attack. With it, you can create a floppy to boot your system, perform a cleanup, and get your system running again. Unfortunately, the Rescue Disk doesn't yet support systems with NTFS partitions, which is a major drawback because Windows 2000/XP systems typically use NTFS by default.

There are other interesting touches, too. The Virus Map tool shows a world map with geographic reporting of virus activity. You can pick a virus from the Top 10 most active list to see where it's festering right now. VirusScan also polls Microsoft directly to learn about the latest Windows vulnerabilities *and* checks your system to see if you're patched against them. We also liked the link to McAfee's site that lets you determine if a given virus threat is real or a hoax.



my security index

These indices measure how secure your computer is. An index value of 10 is best, while 1 indicates a potential security risk.

My Security Index	**5.8**
My AntiVirus Index	10.0
My AntiHacker Index	1.0
My AntiAbuse Index	1.0
My AntiSpam Index	1.0

windows updates

Enabled but not the recommended option — Enable

my service status

Specifies which McAfee services are protecting your computer.

VirusScan	**Protecting**
Personal Firewall Plus	**Not Installed**
Privacy Service	**Not Installed**
SpamKiller	**Not Installed**

virus advisory

W32/Zafi.d@MM is a medium risk worm for home users. This worm mails itself to harvested e-mails and attempts to shut down security services.

Up-to-date VirusScan users are protected from this threat.

Get anti-virus protection now!

virus information

Recent Threats
Virus Removal Tools

VirusScan
$39.99 (annual subscription)
Networks Associates
www.mcafee.com

Symantec Norton AntiVirus 2005

Symantec's Norton AntiVirus brand is probably the most widely recognized antivirus product. The 2005 iteration of NAV is loaded with many useful new features, including spyware scanning, worm blocking, and instant-messenger protection. However, the way the package hangs together isn't quite as solid as some of the other products here.

To insure that NAV isn't installing itself on an infected system, the program performs a quick self-scan before doing the actual install. After setup the user can run a more complete system scan, including on compressed files. The scanning process works through a multistep wizard that spells out options for each phase of the scan: scan, repair (fix, quarantine, or delete, for example), manual removal of infected files, and a summary pane.

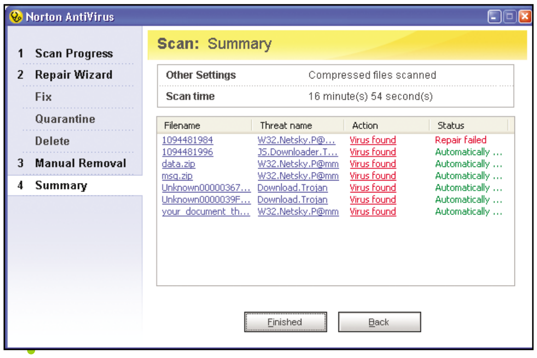
NAV's Internet Worm Protection feature edges the program closer to being a full firewall instead of merely an antivirus product. Unauthorized programs that attempt to establish unusual outbound connections get flagged and blocked. The user can also configure an exclusion list to

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

keep legitimate apps from being blocked and set up or modify rules that govern how network connections are inspected. Another useful feature is AutoBlock. With it, any attacking computer is automatically blocked by IP address. Instant Messenger protection scans files delivered through AOL, MSN, and Yahoo!'s instant messenger clients, and the program also scans for viruses in incoming and outgoing mail traffic. (Any POP3/SMTP mail client will work and no plug-ins are needed.)

The best new feature is built-in screening for programs not previously considered viruses but that are just as bad, such as spyware, dialers, hijackers, hack tools, and so on. The protection isn't quite as comprehensive as programs such as Spybot Search & Destroy afford, but it's nice to have it in the same package.

The big downside to NAV is program stability, hence the app's lower overall score. Many people have reported problems with the Microsoft Office antivirus plug-in, to the point where Microsoft representatives don't recommend using it. NAV refused to install correctly on a Virtual PC installation in our testing; it locked up during the post-install configuration process. In addition, even on a machine where it otherwise ran well, it threw up uninformative error dialogs when we tried to open some of the configuration screens. A program that has this many good features deserves to be more reliable.


Norton AntiVirus

Scan: Summary

Other Settings	Compressed files scanned
Scan time	16 minute(s) 54 second(s)

Filename	Threat name	Action	Status
1094481984	W32.Netsky.P@...	Virus found	Repair failed
1094481996	JS.Downloader.T...	Virus found	Automatically ...
data.zip	W32.Netsky.P@mm	Virus found	Automatically ...
msg.zip	W32.Netsky.P@mm	Virus found	Automatically ...
Unknown00000367...	Download.Trojan	Virus found	Automatically ...
Unknown0000039F...	Download.Trojan	Virus found	Automatically ...
your_document_th...	W32.Netsky.P@mm	Virus found	Automatically ...

Norton AntiVirus 2005

$49.95

Symantec

www.symantec.com

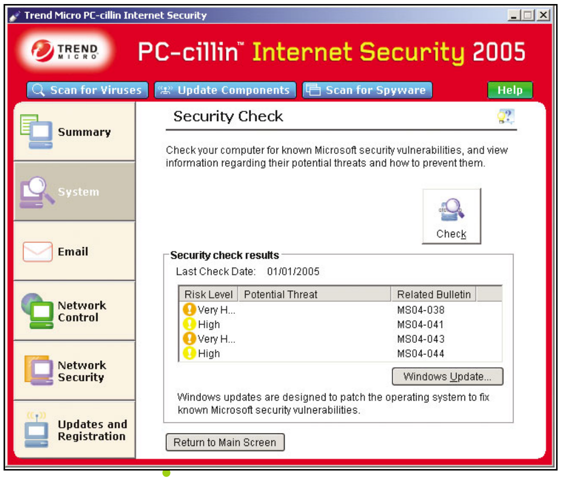
Trend Micro PC-Cillin Internet Security 2005

Trend Micro's PC-Cillin has always been quite good, and the newest iteration is no exception. It bundles virus scanning, spyware detection, spam filtering, network controls, and other useful bits and pieces into one product. The best part is that all of this actually runs well together.

As with the other products in this roundup, you can set PC-Cillin to scan for viruses passively and on demand. PC-Cillin can also do custom on-demand scans. For example, you can set the app to scan only Excel or Word documents or several layers deep into compressed files. The spyware scanner isn't very configurable, though; it only works from Trend Micro's own dictionary of offending programs. The app's email scanning function, however, can scan attachments downloaded from Web email applications, specifically Yahoo!, AOL, and MSN. An Outbreak Warning pop-up window can also alert users to new threats.

PC-Cillin also takes specific proactive measures against network viruses, including going so far as to halt all Internet traffic if it detects one. The program can also scan the system for the presence of Microsoft-documented security issues and recommend immediate fixes. If you want to constrain Web browsing on the computer, the URL Filter function lets you define lists of accepted or restricted URLs (with many predefined categories available). The Wi-Fi Detection function lets you define lists of computers allowed on your local network and alerts you if there are any unauthorized users, which is handy if you're using peer-to-peer wireless rather than a router.

If other computers on the same network have Trend Micro products installed, you can remotely manage them through PC-Cillin. For example, you can conduct remote virus scans, check system security, or ensure that other copies of PC-Cillin are up-to-date. Laptop users or admins for multiuser PCs will like the multiple user/locale profile feature, with which you can set different security settings for home vs. office vs. on the road. The more we worked with this program, the more we discovered there was a lot to like.


Trend Micro PC-cillin Internet Security

Security Check

Check your computer for known Microsoft security vulnerabilities, and view information regarding their potential threats and how to prevent them.

Security check results

Last Check Date: 01/01/2005

Risk Level	Potential Threat	Related Bulletin
Very H...		MS04-038
High		MS04-041
Very H...		MS04-043
High		MS04-044

Windows updates are designed to patch the operating system to fix known Microsoft security vulnerabilities.

PC-Cillin Internet Security 2005

$49.95

Trend Micro

www.trendmicro.com

If you want to try PC-Cillin's scanning engine online, go to housecall.trendmicro.com and click the HouseCall link. The HouseCall scanning engine, by the way, is the only online scanning system certified through ICSA.

The Best Defense

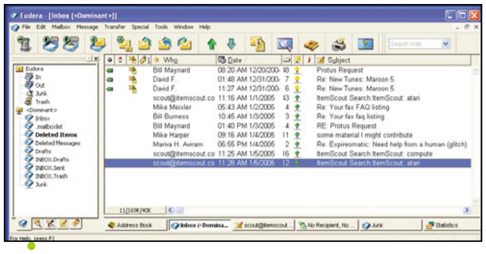
Our biggest thumbs up out of this bunch goes to PC-Cillin for getting the whole package right. PC-Cillin protects against a remarkable range of threats, doesn't sacrifice usability or system stability to do so, and won't break the bank, either. For basic protection, eTrust EZ Antivirus from Computer Associates may be the best value for the money.

by Serdar Yegulalp

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

by Kevin Savetz

Eudora 6.2



Who	Date		Subject
Bill Maynard	08:20 AM 12/20/200-	18	Protus Request
David F.	01:48 AM 12/31/200-	7	Re: New Tunes: Maroon 5
David F.	11:27 AM 12/31/200-	6	Re: New Tunes: Maroon 5
scout@itemscout.co	11:16 AM 1/1/2005	13	ItemScout Search:ItemScout: atari
Mike Meixler	05:43 AM 1/2/2005	4	Re: Your fax FAQ listing
Bill Burness	10:45 AM 1/3/2005	3	Re: Your fax faq listing
Bill Maynard	01:40 PM 1/3/2005	4	RE: Protus Request
Mike Harper	09:16 AM 1/4/2005	11	some material I might contribute
Mariva H. Aviram	06:55 PM 1/4/2005	2	Re: Expireomatic: Need help from a human (glitch)
scout@itemscout.co	11:25 AM 1/5/2005	16	ItemScout Search:ItemScout: compute
scout@itemscout.co	11:28 AM 1/5/2005	12	ItemScout Search:ItemScout: atari

Eudora 6.2
- Free or $49.95 ($39.95 upgrade)
- Qualcomm
- www.eudora.com

Eudora has been around for years, evolving into a sturdy, capable email client. Beyond reading/sending mail, the multiplatform app (Windows 98 and later and Mac OS X) lets you effectively manage an onslaught of mail.

Version 6.2 adds ScamWatch to help detect phishing attempts, SSL email encryption, improved IMAP support, spell checking as you type, decent mail filtering, and more. There's also features of questionable use, such as graphical emoticons, a text summarizer, and a MoodWatch tool to warn you if you're about to send a potentially angry or offensive missive.

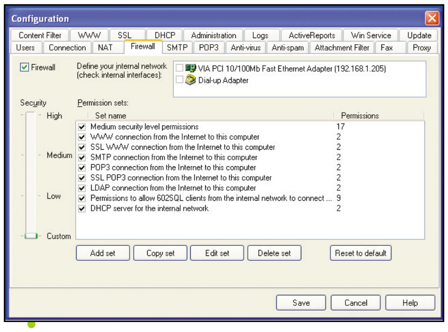
Although MoodWatch, ScamWatch, and the emoticons may appeal to less sophisticated email users, there are plenty of advanced features, including a wide variety of plug-ins, Kerberos authentication, and more configuration options than you can count. A Statistics page provides graphs related to your email habits, such as the number of sent messages and amount of spam received over time. SpamWatch is a boon for POP3 users, but it wouldn't work with our IMAP server, which lacked a required extension.

If the app's strong feature set is a result of its age, so is the program's biggest liability. The UI sometimes seems old and crusty, littered with tiny icons and menus that appear unchanged since they were introduced years ago. The problem is especially notable in the Mac OS version. If you've been using Eudora for long, version 6.2 will have a familiar comfort. For new users, the busy interface might be less approachable.

Eudora is commercial software, but it lets you find the right balance of features, ads, and price. The Paid mode delivers the complete feature set plus technical support for $49.95 ($39.95 upgrade). The Sponsored mode provides the same features except the junk mail filter, and the tech support is free in exchange for on-screen ads. The Light mode is free and lacks ads, but provides only a bare-bones set of features.

If you are shopping for a new email application, Eudora is certainly worth a look. The UI isn't perfect, but the power features and tools for newbies make it appealing. ▲

602 Software 602 LAN Suite 2004



☑ Firewall

Define your internal network (check internal interfaces):
☐ VIA PCI 10/100Mb Fast Ethernet Adapter (192.168.1.205)
☐ Dial-up Adapter

Permission sets:

Set name	Permissions
☑ Medium security level permissions	17
☑ WWW connection from the Internet to this computer	2
☑ SSL WWW connection from the Internet to this computer	2
☑ SMTP connection from the Internet to this computer	2
☑ POP3 connection from the Internet to this computer	2
☑ SSL POP3 connection from the Internet to this computer	2
☑ LDAP connection from the Internet to this computer	2
☑ Permissions to allow 602SQL clients from the internal network to connect ...	9
☑ DHCP server for the internal network	2

602 LAN Suite 2004
- Free, five users; additional features, $99.95 and up
- 602 Software
- www.software602.com

If you've been dreading the thought of setting up the network for a growing business, 602 LAN Suite 2004 can reduce the daunting task to a pleasant afternoon. The software provides everything that a small business needs in a LAN—in fact, it has more than most will need.

The program lets you share a single connection (dial-up or broadband) with any number of computers on a LAN; complete with a firewall, POP3/SMTP email server, Web server, and many proxies (HTTP, FTP, Telnet, and SOCKS). There's also a fax server for sending/receiving faxes via a TAPI modem.

Mail services are significantly improved in this update. A Bayesian antispam filter was added to the mail server and an attachment filter can automatically strip files, with specified extensions, from all incoming mail. Users can fetch email using any POP3 email client (IMAP, frustratingly, isn't supported) or LAN Suite's Web mail interface. Web mail support is significantly improved in this version, adding a new Outlook-like look and folders to organize old mail.

Despite doing so much, LAN Suite is easy to set up. Configuration takes just a few minutes. Some of the application's text reads like it was written by someone for whom English wasn't a first language, but the program is intuitive and the documentation is adequate.

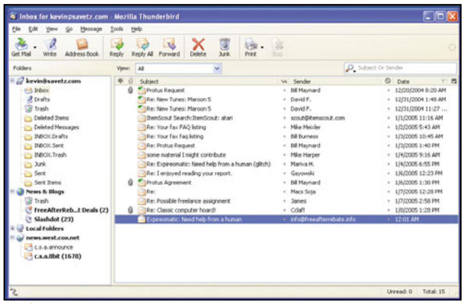
The program's five-user version is free for commercial or noncommercial use. More users or extra features will cost you, starting at $149.99 for 10 users. Various optional add-ons include an Anti-virus edition that can check incoming messages for viruses, a Web Content Filter that lets you limit employees' access to recreational Web sites, and an ActiveReports add-on that provides analysis of email, Web, NAT, and fax usage.

The app works with Windows 98/NT/Me/2000/XP/Server 2003, but it requires WinXP/2000/Server 2003 for the firewall and support for more than 10 users. LAN Suite is a versatile tool that takes the pain out of creating a secure and safe LAN for an office setting. ▲

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

Battle Of The Free Email Clients

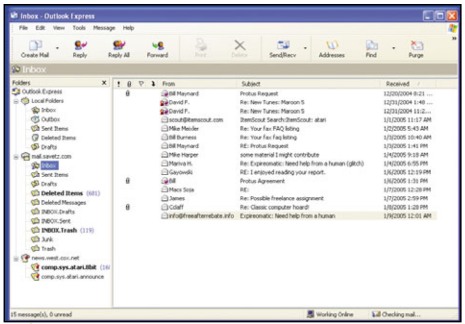
Mozilla Thunderbird vs. Outlook Express: Fight!



Subject	Sender	Date
Protus Request	Bill Maynard	12/20/2004 8:20 AM
Re: New Tunes: Maroon 5	David F.	12/31/2004 1:48 AM
Re: New Tunes: Maroon 5	David F.	12/31/2004 11:27 ...
ItemScout Search:ItemScout: atari	scout@itemscout.com	1/1/2005 11:16 AM
Re: Your fax FAQ listing	Mike Meixler	1/2/2005 5:43 AM
Re: Your fax faq listing	Bill Burness	1/3/2005 10:45 AM
Re: Protus Request	Bill Maynard	1/3/2005 1:40 PM
some material I might contribute	Mike Harper	1/4/2005 9:16 AM
Re: Expireomatic: Need help from a human (glitch)	Mariva H.	1/4/2005 6:55 PM
Re: I enjoyed reading your report.	Gayowski	1/6/2005 12:23 PM
Protus Agreement	Bill Maynard	1/6/2005 1:30 PM
Re:	Macs Soja	1/7/2005 12:28 PM
Re: Possible freelance assignment	James	1/7/2005 2:58 PM
Re: Classic computer hoard!	Cdaff	1/8/2005 1:28 PM
Expireomatic: Need help from a human	info@freeafterrebate.info	12:01 AM

- **Thunderbird 1.0**
- Free
- Mozilla
- www.mozilla.org/products/thunderbird

CPU CPU CPU CPU



From	Subject	Received
Bill Maynard	Protus Request	12/20/2004 8:21 ...
David F.	Re: New Tunes: Maroon 5	12/31/2004 1:48 ...
David F.	Re: New Tunes: Maroon 5	12/31/2004 11:2...
scout@itemscout.com	ItemScout Search:ItemScout: atari	1/1/2005 11:17 AM
Mike Meixler	Re: Your fax FAQ listing	1/2/2005 5:43 AM
Bill Burness	Re: Your fax faq listing	1/3/2005 10:40 AM
Bill Maynard	RE: Protus Request	1/3/2005 1:41 PM
Mike Harper	some material I might contribute	1/4/2005 9:18 AM
Mariva H.	Re: Expireomatic: Need help from a human (glitch)	1/4/2005 6:55 PM
Gayowski	RE: I enjoyed reading your report.	1/6/2005 12:19 PM
Bill	Protus Agreement	1/6/2005 1:31 PM
Macs Soja	RE:	1/7/2005 12:28 PM
James	Re: Possible freelance assignment	1/7/2005 2:59 PM
Cdaff	Re: Classic computer hoard!	1/8/2005 1:28 PM
info@freeafterrebate.info	Expireomatic: Need help from a human	1/9/2005 12:01 AM

- **Outlook Express 6**
- Free
- Microsoft
- www.microsoft.com/windows/ie/downloads

CPU CPU CPU

Mozilla's speedy and secure, open-source Firefox Web browser surged in popularity shortly after the release of version 1.0, becoming the preferred alternative to Internet Explorer for millions of users. Can Mozilla's upstart email client, Thunderbird 1.0, similarly become *the* alternative to Outlook Express as the standard in free email tools?

Outlook Express, which comes preinstalled on Windows systems, is now at version 6 and is downloadable as part of the Internet Explorer 6 Service Pack 1 at www.microsoft.com/windows/ie/downloads. Overall, Outlook Express is a capable client for email and newsgroups, but its biggest liability is that it is notoriously prone to viruses and other security breaches. Recent patches have fixed many of these problems, but some exploits remain and years of security troubles have permanently soured many users on the program.

Thunderbird also does email and Usenet, and the app's interface is similar to that of Outlook Express. Like Outlook Express, Thunderbird uses a three-pane interface by default, but you can switch to other views. Thunderbird also brings an RSS reader to the party. Although we generally prefer applications that do just one thing well, the RSS reader makes sense here and it shares the same clean interface as the email and Usenet readers.

Thunderbird includes several important features that Outlook Express only makes available with add-ons, including a Bayesian junk mail filter and a built-in spell checker (it doesn't check as you type). Thunderbird's most important advantage over Outlook Express, however, is security. Many users simply believe that Thunderbird is inherently safer than Outlook Express, as it doesn't use IE's HTML rendering engine, doesn't act on JavaScript embedded in messages, and more. Thunderbird has another characteristic that Outlook Express (or Outlook for that matter) can't match: support for Linux, Mac OS X, and other OSes. In addition, the interface is very consistent from OS to OS.

If you have more than one email account, Outlook Express only lets you view one at a time. Thunderbird gives you the option to view your accounts in a single, combined inbox. Another cool feature of Thunderbird is customizable message views, which instantly show inbox messages from family members, friends, messages you've received within the last five days, or by using other criteria you specify. In addition, dozens of extensions are available to add features or change Thunderbird's look and feel. Outlook Express can download and display messages from your Hotmail account, which Thunderbird can only do via an extension.

Outlook Express' newsreader is far superior to Thunderbird's, including a feature to kill files and the ability to combine and decode multipart binary postings. Thunderbird probably won't be an acceptable choice for Usenet addicts. It also can't match some of the features in Outlook (the email client included in Microsoft Office), such as calendar, scheduling, and PDA synchronization functions. That said, Thunderbird isn't trying to compete with Outlook feature for feature; it's more like Outlook Express.

Both programs are solid and feature-filled, but for email, Thunderbird is simply better. It pulls ahead with its spam filter and spell check features. Add in that it isn't built on IE's insecure HTML rendering engine, and you've got a powerful, safer program that's definitely worth considering switching to. ▲

by Kevin Savetz

Which App Is For You?

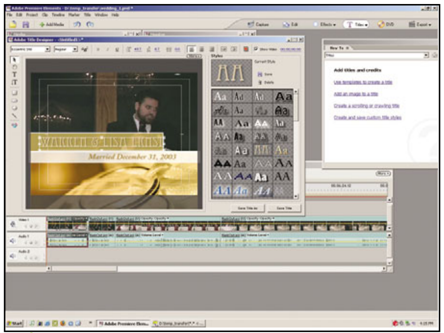
Both are free. Both handle email solidly. Both have similar interfaces. That's just about where the likenesses end. Thunderbird or Outlook Express? You make the call. ▲

	Microsoft Outlook Express	Mozilla Thunderbird
Email protocols	POP, IMAP, Hotmail	POP, IMAP (others with plug-ins)
Usenet newsreader	Full-featured	Yes; lacks ability to kill files, combine/decode, header customization
RSS reader	No	Yes
Spam filter	No	Yes
Spell checker	No	Yes
Email features	Contact synchronization, better address book	Global inbox for multiple accounts, customizable message views
Operating systems	Windows	Windows 98/NT/Me/2000/XP; Mac OS X; Linux; Solaris; OS/2

CPU Ranking: 0 = Absolutely Worthless CPU CPU C 2.5 = Absolutely Average CPU CPU CPU CPU CPU 5 = Absolutely Perfect

by Warren Ernst

Adobe Premiere Elements



Premiere Elements
- $99
- Adobe
- www.adobe.com

Adobe's Photoshop Elements sets the standard in transforming the powerful, sometimes difficult-to-learn Photoshop into an app that's easy to learn and use, while retaining most of the original's power. Premiere Elements does the same for video, letting you transfer content from almost any modern DV camera (via FireWire); combine it with additional audio, video, and still images; and whip out a DVD with a full menu. PE does a stellar job of simplifying the excellent, pro-quality Premiere, making it suitable for home and prosumer users who want more power than Microsoft's Movie Maker.

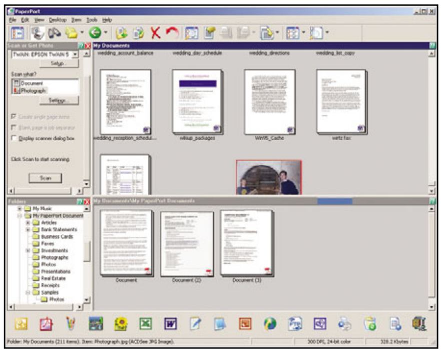
Other video editors and DVD builders are available from Ulead, Pinnacle, and Apple, but several unique qualities make PE stand out. For starters, it bundles a training DVD that's far better at introducing you to video-editing concepts and PE's features than any written tutorial. PE also works with Photoshop Elements for directly editing still images in the video timeline.

PE includes shortcuts that reconfigure the UI and display wizards for all the major video-creation tasks, such as video capture, editing, and arranging video and audio clips in a timeline; adding special AV effects and transitions; adding titles and other text; creating a DVD menu structure; and burning a DVD or exporting to a new video file. A How-To window also displays links to instructions relevant to the shortcut you've clicked, so you rarely need to consult the manual.

The wizards and templates generate extremely attractive and professional results, but there are areas where you can't stray. For example, you can't change backgrounds on the DVD menu templates, and none of the templates have moving backgrounds. You can manually alter the properties of various special effects, however.

PE can be a little slow; it took 46 minutes to create a 26-minute DVD on a 3GHz P4 system with 1GB of RAM and an 8X DVD drive. Still, the results were impressive and the tools easy to use. Anyone looking for a step up from Windows' free tools will find PE worthwhile. ▲

ScanSoft PaperPort Professional 10



PaperPort Professional 10
- $199
- ScanSoft
- www.scansoft.com

Scanners can be the most troublesome of all major computer peripherals because often it isn't obvious to new users how to exactly make them useful. Questions such as "How do I scan a photo into email?" and "Why can't I open this scanned document with Microsoft Word?" can lead to complicated answers involving lots of steps. PaperPort 10 Professional answers these questions and others with simplicity and flexibility, although with slightly less elegance (but more power) than previous versions.

Most scanners bundle fairly rudimentary scanning software, along with a driver (usually a TWAIN driver) capable of passing the scanning baton to whatever third-party program can accept a scanned image. PaperPort 10 Pro takes that baton and runs like crazy with it, easily passing off scans to dozens of other programs. Want to fax or email a scanned document or photo? Let PaperPort scan the image and display the thumbnail on its own PaperPort Desktop. Then just drag the thumbnail on top of the Outlook Express or WinFax link icons (icons appear based on what software you already have installed), and those other programs take the scan almost as if by magic. Scans of documents you drag into the Microsoft Word link icon are automatically OCRed and pasted into a new Word document.

Scans can also live in the PaperPort Desktop for permanent storage, where you can organize and search them by keyword, background OCRing and indexing, or text. Whereas earlier versions required scans to reside within their own segregated folder structure, version 10 uses the normal folders already on your drives. Although this can increase clutter, you can now easily store scans on network drives along with Word files, PDFs, and others. Additionally, the default scan format is PDF instead of a proprietary MAX format, so sharing files with others is far simpler.

Although the increase of features makes skimming the brief tutorial book a requirement, PaperPort 10 Professional is the software that should come with every scanner. ▲

CPU Ranking: 0 = Absolutely Worthless 2.5 = Absolutely Average 5 = Absolutely Perfect

Searching Seems To Be The Hardest Word

by Chris Pirillo

"To find" is such a simple expression, but have you ever tried to find a file containing the word "find" in it? The F3 key is just a finger's stretch away, but even in the latest version of Windows, the Search feature lacks precision, relevance, and most importantly speed. That's all about to change. In 2005, the battle for the Desktop will begin—all over again. If you don't know why you need to read this article, you really need to read it.

Several leading software companies are throwing their hats into the ring, but there's already a clear winner, which will likely surprise you given the short list of notable entrants. I use a nonscientific approach to reviewing software, if you hadn't noticed already. The less I think of what needs to change, the happier I am with the product. Few complaints = higher mindshare. Note that each of the following products contains a "deskbar," a search field on the Taskbar, but my allegiance lies unwaveringly with Dave's Quick Search Taskbar Toolbar Deskbar (dqsd.net).

If there was a visionary for this genre, it's X1 ($75; x1.com). As you read this, the price may be less or have been eliminated altogether, given that this type of software is quickly becoming a loss leader for most competitors. With the latest beta (5.0), the UI has become Office 2003ish, a welcomed change for some. X1 is definitely powerful, quick, and efficient, but seamless, intuitive usability has been strangely overlooked. I found myself wondering why things weren't working the way I wanted them to too many times to be totally happy. Let's hope X1 takes my list of suggestions seriously before a final version is released.

From desktop.google.com you can download Google Desktop. It indexes common files (such as Office docs) and not-so-common files (such AOL AIM logs). As far as its integration is concerned, it's darn near seamless. It wraps itself within your browser, so it seems you're doing nothing more than browsing the Web when in fact you're viewing content on your local system. Talk about transparency! It's to the point where common users could easily become confused with what's sitting where and why. Is that good? I'm not so sure. It does a great job at the basic levels and navigation is smooth, but three background processes seems like overkill. I like it but not enough to run it regularly.

MSN isn't sitting this one out, either. It is struggling to play catch up once again, hoping someone will install its "me too" toolbar. The early beta suite (beta.toolbar.msn.com) felt clumsy compared to its counterparts and its features lackluster. As with most things Microsoft, wait until v3.0 before embracing it. That oughta be in another two years. My suggestion is select something else.

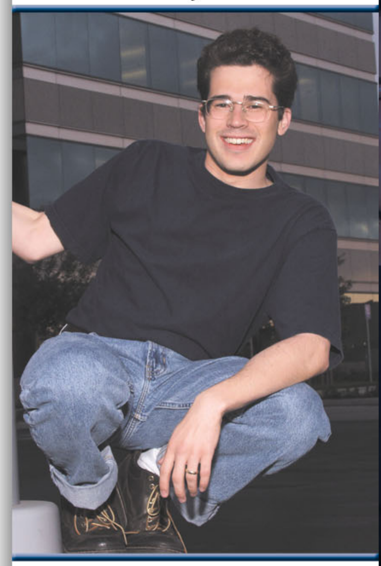
Outlook folks went ape over Lookout almost immediately (free; lookoutsoft.com). Its integration with the PIM is a large part of its charm. Microsoft quickly acquired the utility without necessarily announcing its intentions on future development. Still, Lookout's convenience has generated quite a bit of buzz in a relatively short amount of time. Lookout lacks superficial bells and whistles, but not to its detriment.

In the same breath, power users are also likely to mention Filehand Search (free; filehand.com). It presents information in a Google-like format within a standalone window, but it does it better than Google and with relevance. This is a great middle-of-the-road client. It's being developed by two very passionate developers. Where it can't compete in overall staff numbers, it can more than make up for with total tool functionality.

By far—and I mean, literally miles ahead—the best local engine in this category is Copernic's Desktop Search (free; copernic.com). Let me put it this way: Within five minutes of use, I was installing it on every system in my home network. It provides an uncluttered, straightforward, robust experience without need for tweaking. Still, I could further customize it to my liking, more so than any of the other apps here. It's perfect for expert users and novices alike.

Now it's time for you to find something else to do, if you can find it, that is. ▲

You can dialogue with Chris at chris@cpumag.com



Whether he's "FINDing Nemo" or "SEARCHing for Bobby Fischer," Chris Pirillo is always on the lookout for tips, tweaks, and total time-savers. Rumors of Lockergnome.com's demise, the site he FOUNDed, are completely unreSEARCHed. His least favorite "Star Trek" movie was the third installment, "The SEARCH for Spock." His favorite Johnny Depp movie is "FINDing Neverland." His favorite David Spade movie is "Lost & FOUND." He watches "Star SEARCH" reruns, pausing only to sleep and eat. Where he FINDs the time to complete these columns for CPU *is beyond us.*

The less I think of what needs to change, the happier I am with the product.

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Open Sauce

My Knoppix Adventure

by Pete Loshin

The last thing I want to drag along on any trip is a laptop. So, on this year's trek to visit family up and down the East Coast, I ditched my laptop and lost 10 pounds of ugly fat.

The Knoppix LiveCD distribution (and its many offspring) is the coolest thing since writeable CDs. I have been a mostly theoretical fan of these distributions, but I decided to put Knoppix to the test by depending on it for all my mobile computing needs on whatever PC my family members saw fit to make available to us. All I took along with me was a Knoppix 3.7 LiveCD and a 256MB USB RAM doodle for storing my desktop and configuration.

The theory was that I could boot from CD, write my config to USB memory, and be good to go anywhere I could find a CD-bootable PC. I just needed to check email, do some work, and share old family photos, plus new ones I took along the way.

The plan was to burn the latest Knoppix (3.7) to CD, configure it, and dump my working data onto the desktop. I would use Mozilla for browsing with my favorite bookmarks and for checking mail. I would use KuickShow, the KDE image viewer, for slideshows and a USB CompactFlash reader to view new snaps with ease.

Knoppix has everything I need in the course of a normal work day: Emacs (and eight other text editors); GIMP for graphics; OpenOffice.org for word processing, spreadsheets, and presentations; Mozilla (and others) for Web browsing and email; a dozen or so games; and dozens of other applications and utilities.

What actually jumpstarted Knoppix for me was Kyle Rankin's "Knoppix Hacks" from O'Reilly. While some hacks weren't all that tricky, most are killer, and it's nice to have them with you in a handy printed package while you're messing around with a new desktop. That's why my portable desktop was more like a pound than an ounce. Rankin and company answer the questions you'll have if you want to usefully use Knoppix but don't want to waste hours figuring it out yourself.

Executing the plan was the work of a rainy, late December afternoon and a matter of copying configuration and bookmark files from my desktop, an image for the desktop background, and other odds and ends. The Knoppix desktop includes options for creating a persistent desktop so you don't have to reconfigure everything from scratch each time you boot. It saves application configurations, too. It all works fine as long as you have a partition to copy to, which is where a CompactFlash card or USB RAM stick comes in. Then, you can boot to your own desktop anytime just by plugging in and issuing a kernel command (knoppix myconfig=scan) at boot time.

On the road, it worked wherever I went: on my father-in-law's latest and greatest laptop, my brother's bread-and-butter family PC, and even the crusty, dusty Pentium III he's turning into a Linux database server. At about four years, it isn't terribly old in human years, but that's 65 in PC years and it's time to retire. Booting to Linux with Knoppix showed that the old Dell has some life in her.

My brother, David Loshin, information management expert and CEO of Knowledge Integrity (knowledge-integrity.com), dislikes waste as much as I do, so we ran out for a hard drive, extra RAM, and a full Linux distro (SUSE 9.2). We knew Linux ran fine because we had booted Knoppix. So, in went the RAM and drive and then the SUSE install. We got a nasty error message and nothing booted, Linux or Windows. That could have been nasty, but after checking the Knoppix installation and surfing the Web (on the same system giving us a problem) for an answer, we succeeded in almost record time. We repartitioned the drive to work around a BIOS limitation related to disk size and my brother had a great new Linux machine.

I know some of you are having trouble getting Linux running on your systems. I don't always have the answers, but send your questions to linuxtrouble@loshin.com and I'll do my best. ▲

Pete Loshin, former technical editor of software reviews for Byte Magazine *(print version), consults and writes about computing and the Internet. He also runs www.linuxcookbook.com. He owns shares of both Microsoft and Red Hat and believes that Windows isn't for everyone, but neither is Linux.*

> The Knoppix LiveCD distribution (and its many offspring) is the coolest thing since writeable CDs.

Get saucy with Pete at pete@cpumag.com.

Hello Wireless

Will Broadband Go Wireless?

Why shouldn't you be able to open your laptop anytime in any major urban areas and pull down email and Web sites at broadband speeds without having to hunt for a Wi-Fi hotspot? Why can't we get high-speed Internet access to developing areas or rural America without laying down costly infrastructures of DSL or cable lines? Why not have a single wireless broadband provider that lets you access your account at home, work, or play? In short, why can't we broadcast broadband signals to large and remote areas in much the same way radio stations reach out to your car audio receiver? Why not, you may ask. (See pages 42-43 in the July 2004 issue of *CPU* for earlier info on WiMAX. Why not?)

Why not WiMAX (Worldwide Interoperability for Microwave Access)? This is the emerging reply from the tech industry. Although most of us are still salivating over the 100-foot coverage from 802.11g connections to home routers and coffee shop hotspots, Intel and a coalition of others are hoping to lead us into a new era of 802.16 WiMAX connectivity, a wireless standard that can broadcast high-speed access for miles in any direction. Although WiMAX is still well below most people's radar, and probably won't be deployed to consumers until 2007, many analysts and start-ups see this standard as the key to extending broadband to new areas and even challenging the wired DSL and cable modem industries. "The winds of change will soon be apparent," says a recent study by research firm Visant Strategies. "Wireless solutions for broadband will outpace the growth of wireline options beginning in 2009."

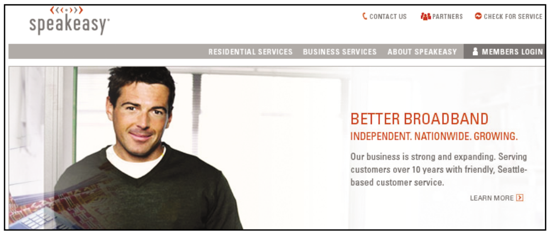
What MAX?

Wireless broadband is not entirely new. In the United States and Europe a number of mobile phone providers, such as Verizon, have been experimenting with their own proprietary, nonstandard networks that can send data to wireless modems at speeds above 300Kbps; which generally is considered broadband caliber. Businesses have been slow to pick up on these solutions, however, because they are often costly, suffer from limited coverage, and usually require proprietary hardware. WiMAX supporters are hoping that by rallying around a single 802.16 technical standard, WiMAX will follow in the footsteps of 802.11/a/b/g Wi-Fi and create a set of inexpensive, interoperable technologies that manufacturers and consumers will embrace quickly. The same IEEE engineering coalition that set the Wi-Fi standard recently ratified a 802.16-2004 wireless broadband spec. This spec gives hardware manufacturers, such as Intel, Wavesat, Proxim, and other early supporters of the platform, a single standard for making interoperable WiMAX hardware that can work at many different radio frequencies and in numerous conditions.

The basic 802.16 setup should be easy to implement. A WiMAX base station can be put on a tall building or a tower in any area. Although 802.11a/b/g Wi-Fi operates in the publicly available 2.4GHz and 5.8GHz radio frequency bands, the WiMAX specifications allow ISPs to use different pieces of the public and licensed radio spectrum for different types of service below the 11GHz range. For WiMAX receivers that are in the direct line of sight of these broadcast towers, a signal working at up to 75Mbps transfer speeds can reach up to a 30-mile radius. People in rural areas can place a small receiver on their roof, much as they do with satellite TV, to get two-way high-speed access far outside of urban or suburban areas.

But the beauty of the new WiMAX standard is that like common Wi-Fi, users closer to the broadcast center (within 3 to 5 miles) don't need to be in the direct line of sight of the base station to receive their broadband signal directly into a desktop or laptop WiMAX card. The recent revisions to the 802.16 wireless standard include specs so that WiMAX receivers don't require a direct line of sight to the transmitter. This opens the WiMAX market to chipmakers such as Intel, who could put WiMAX capability into laptop chipsets such as Centrino. Forget looking for small Wi-Fi hotspots. Under WiMAX, most urban and suburban areas would become one huge, live hotspot, and by 2008 most new laptops would be able to pick up the signals.

Many people will use that 75Mbps fat pipe of data from a WiMAX signal, so end users will experience different speeds, according to how a provider parses the feeds, the power of the transmitter, and where the user is relative to the base station. For instance, in the first commercial deployment of WiMAX, Seattle-based Speakeasy will offer upload and download speeds of 3Mbps to test the technology in the city's downtown area in early 2005. Three to four base stations will be positioned at high spots around hilly Seattle, and commercial customers will pull in the signal with small receivers attached to their office window. In the early stages, only 500 users will be allowed online at a time in order to better gauge how WiMAX performance scales under heavy traffic. Still, at 3Mbps, the Speakeasy WiMAX line can give businesses up to twice the speed of many $500 T-1 lines, but the company reportedly will price the service at a slightly



Our business is strong and expanding. Serving customers over 10 years with friendly, Seattle-based customer service.

Speakeasy is rolling out the first commercially-available WiMAX network that will deliver T-1 access speeds wirelessly to the businesses in that city's downtown area.

higher $650 a month and as low as $300 a month for T-1-level performance. With seed money from Intel, Speakeasy is hoping to offer the service to businesses in other major cities if the Seattle tests work well.

Why MAX?

The exciting part about WiMAX for the industry is its flexibility, there are many ways the technology can work behind the scenes and directly with consumers to extend the reach of truly wireless data access. "I am thinking about WiMAX as a consumer technology or as a business ISP technology," says Mark Denton, product manager for Bridegwater Systems. "There are a lot of uses like one company using it for point to point links," he says. WiMAX can be used to link high-speed network infrastructures among office buildings cheaply and without having to run wire. For companies and municipalities, WiMAX opens up a range of new applications. With WiMAX covering an entire urban area, fleets of utility service people or law enforcement could have direct, high-speed links to all the applications and databases they would have in their home offices.

Long before we consumers have Wi-MAX cards in our laptops, the emerging technology will touch us by extending the reach of current Wi-Fi technology. Initially, industry analysts predict that current hotspot providers will use WiMAX as a backhaul solution that will cheaply connect a broader mesh of Wi-Fi hotspots to a central broadband source. This means that 802.11g hotspots could be set up quickly and easily without the need for a wired broadband connection at the router. A WiMAX receiver anywhere within range of the base station could pull the high-speed connection out of the air and distribute it to Wi-Fi laptops via an inexpensive router. This could bring down the cost and broaden the range of hotspot connectivity years before WiMAX is ready for consumers.

Intel, one of the driving forces behind WiMAX, is partnering with the Chinese cities of Dalian and Chengdu to deploy the technology as a way to bring broadband to areas that do not necessarily have DSL or cable modem infrastructures. In the United States, many of the smaller regional telcos are very interested in wireless broadband as a way to bring faster access to the many rural communities it can't yet reach. The telecommunications industry is very interested in WiMAX as a way to compete with the cable industry, says Denton. "From what we have seen, a number of Tier 3 customers [regional mobile phone providers] want to cover rural areas of North America with WiMAX systems. We certainly have customers who would like to start trialing in mid to late [2005]. It could happen in 2006 or before."

The WiMAX spec will get more interesting sometime this year when the IEEE explores the next revision to the standard, 802.16e. This revision will add mobility to WiMAX, which will let end users move around more fluidly in their coverage area and maintain their broadband connection. Imagine, for instance, WiMAX phones that connect to VoIP systems or broadband-enabled car devices that stay connected even on the highway. Even as many mobile phone companies are starting to roll out their 3G high-speed data networks for cell phones, many in the industry feel that WiMAX could be direct competition for 3G in the next few years. Eric Mantion, senior analyst at In-Stat, believes that a well-deployed WiMAX network could be cheap alternative to current mobile phone systems. "We have calculated that for about $3.7 billion, a company could rollout a national Wi-MAX network to reach over 97.2% of the U.S. population." He speculates that an upstart entrepreneur such as Rupert Murdoch or Richard Branson could invade the U.S. market with WiMAX. "It is entirely probable that in the 2006 to 2007 time frame, the initiative could be extended in hope of spurring a revolt against the high prices of cell phones by upgrading to the 802.16e standard, which supports mobile issues such as roaming and hands-off." Under the WiMAX .16e spec, users should be able to roam within and among these massive hotspots and stay connected.

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compliant with the IEEE 802.16-2004 standard

In late 2004, Canadian manufacturer Wavesat was the first to release a chipset that conforms to the latest 802.16-2004 WiMAX specs, a standard that many analysts predict will take hold in the next few years.

Wi-Fi, Part Deux

Until the release of the formal 802.16-2004 specifications last year, WiMAX had been an enticing theory, but now hardware manufacturers such as Wavesat are releasing chipsets and equipment that many telcos and ISPs will test throughout the next two years. One of the reasons analysts are so excited about WiMAX is because unlike many standards and protocols that come and go without widespread adoption, WiMAX supporters are using the same marketing and PR strategies that helped the 802.11 standards quickly replace all of the proprietary wireless LAN solutions that preceded them. Like the Wi-Fi Alliance before it, the WiMAX Forum, a coalition of more than 100 manufacturers and service providers from AT&T and AOL to Intel and Lucent Technologies, has united around the 802.16 protocols.

One of the keys to the widespread acceptance of Wi-Fi is the Wi-Fi Alliance's role in ensuring hardware interoperability. Comfort with a new standard depends on manufacturers and consumers knowing that cards and routers from one vendor will work with those of another. Wi-Fi took off

The PXA27x family of processors uses Intel Wireless MMX technology, which enables handsets and PDAs to handle the kinds of full-motion and 3D video that WiMAX wireless broadband will offer.

Q&A

Speakeasy's Bruce Chatterley: Ready For WiMAX Rock & Roll

A decade ago, Seattle-based broadband provider Speakeasy was the pioneer of Internet cafes, opening some of the first such public venues for Web access in the United States. Now transformed into a full-service broadband provider in eight major markets, the company will be the first to offer commercial WiMAX sometime later this year. CEO Bruce Chatterley explains that WiMAX will challenge wired solutions because it is so easy to deploy, especially for businesses. Even he admits, however, that moving WiMAX into mass consumer adoption is far from a sure thing.

CPU: What is the status of Speakeasy's WiMAX deployment?

Chatterley: We are complete with our lab trials, site selection, radio frequency planning, and are in the process of deploying the base stations in Seattle. We are ready to rock and roll. You are going to see customer trials in the first quarter and commercial deployment during the second quarter [2005]. So far it has worked to our expectations.

CPU: Who will benefit from WiMAX first, business or consumers?

Chatterley: The equipment costs for the end user will be prohibitive until the end of next year. We'll offer a 3Mbps symmetrical connection, 3Mbps upload and 3Mbps download, for around $600 a month with a full service level agreement and a 48-hour installation time. To put that in context, a wireline T1 is $500 a month at 1.5Mbps and the installation interval is between 18 and 21 days. [WiMAX] is truly disruptive technology. Ultimately, you will order the service from Speakeasy, and we will ship you a small antenna, and you may put it in a window sill or in your house and hook it to an Ethernet cable to your PC and you are in business.

CPU: Are there real technical advantages to WiMAX broadband?

Chatterley: It expands the range of speeds and functionality we can deliver. An ADSL line is asymmetrical. That standard maxes out at a download speed of 7Mbps and uploads max at about 1Mbps. There are no theoretical limits for WiMAX. There isn't a limit to the end user that a home environment would ever hit.

CPU: Bottom line: Is this going to follow in Wi-Fi's footsteps and become a dominant consumer standard?

Chatterley: I think so, but it remains to be seen what is going to happen on the consumer side. In order to get to the mass consumer do you use [cheaper] unlicensed radio spectrum? [More expensive] licensed spectrum gets you higher quality and denser penetration into buildings. The major issue is unlicensed vs. licensed spectrum, which will determine how much capital you will need to cover consumers. The second issue is when you can get equipment to the price point that makes sense for consumers to pay. Intel, I think, is going to do it, but it has to happen in a gateway when the technology has been deployed. ▲

when consumers felt assured that their Netgear 802.11b PC card would connect with their Linksys router. And so, the WiMAX Forum will be testing and approving the 802.16 hardware before it rolls onto the market so it can slap recognizable logos on the equipment to guarantee vendor interoperability. After many false starts in recent years, WiMAX has the best shot at making wireless broadband real. "What is different about this to make it happen is that the technology is more mature," says Bob Larribeau, principal analyst at TelecomView. "The costs are lower and the Wi-Fi experience has opened people's eyes to wireless models."

Larribeau expects WiMAX to follow a similar path to enterprise and consumer acceptance as did Wi-Fi. During the next two years, WiMAX hotspot experiments similar to Speakeasy's in Seattle will pop up around the country, and some businesses will start using the technology for internal and intra-office LANs. Things will really heat up as both the cable TV industry and the phone companies explore WiMAX as a way to poach one another's customers. For the mobile phone industry, which often already has transceiver towers in urban areas, the technology could put them into the high-speed access industry that the cable companies now dominate. For the cable companies, WiMAX would help them give their customers mobile access to their current broadband account, so that users don't need to buy into 3G networks from the mobile phone industry. In short, WiMAX could initiate a titanic battle between telecom and media companies for your business.

Like Wi-Fi before it, however, the future of WiMAX depends on consumers embracing the standard, and this requires the kind of ubiquity that 802.11b/g achieved when Intel started integrating its protocols into Centrino mobile chipsets. Sooner than we think, the same scenario will play out with WiMAX. "We're going to see WiMAX really become available in 2006 and 2007," says Larribeau. "Intel and Proxim are promising integration into consumer devices, and we're expecting in 2007 laptops that support Wi-Fi and WiMAX. As that starts to happen, it will create a major market."

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by Steve Smith

Infinite Loop

Fried Fuel

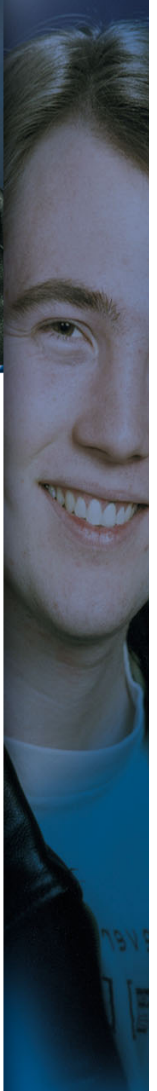
Eating french fries can help the environment. Assuming you save the oil they were fried in, that is. A group of ecologists has converted the diesel engine in an old school bus to run on waste cooking oil. The Sustainable Solutions Caravan tour, traveling from California to Costa Rica, makes stops at restaurants known for their greasy offerings, such as taco stands and Chinese restaurants, to collect waste cooking oil to fuel the next leg of the green-awareness journey. When the bus burns the used vegetable oil, the oil releases the same amount of carbon as the plant it came from took in during its life, meaning the oil is carbon-neutral. Now, if only the act of eating french fries burned the same number of calories as in the fries. . . . ▲

Source: www.reuters.com

flyincar.txt

by Rob "CmdrTaco" Malda

Rob "CmdrTaco" Malda is the creator and director of the popular News for Nerds Web site Slashdot.org. He spends his time fiddling with electronic gizmos, wandering the 'Net, watching anime, and trying to think of clever lies to put in his bio so that he seems cooler than he actually is.



You know you want the flying car. You crave it. You saw it on "The Jetsons" and knew that you had to have one. OK, you were realistic about the part where it folds up into a suitcase: That's just science fantasy. But the flying car? Inevitable. But it's just not here yet.

Computers are no different. There are countless "flying cars" that we've been sitting around and waiting for. Sure, our desktops are getting faster every year. More RAM. Higher resolution display devices. Every few years they learn knew tricks—I mean, we still haven't dealt with all the ramifications of that crazy "Internet" thing they figured out in the '90s.

But where's my flying car? What do I mean? I mean the computer that I can talk to. The one that I can actually dictate intelligent commands to, and it actually does what I want "Star Trek" style. I mean the 3D user interface where I wave my hands around and manipulate data in a holographic third dimension. I mean the heads-up display that superimposes data onto a pair of glasses helping me remember the name of the guy I just bumped into at the mall, because he sure as hell remembers my name.

I'm talking about fast-streaming, always available Internet access from wherever I might be. From an airplane to the middle of a desert, I ought to be able to watch any TV program I want now . . . from the first episode of the original "The Twilight Zone" to last night's episode of "Lost."

It knows every conceivable way that I can be communicated with—from voicemail and telephone calls to IRC, SMS, AIM, ICQ, and Jabber. From a message board on a Web site that I frequent to an RSS feed that I read daily. No matter what method of communication is used, my computer should know who is talking and what they are talking about. And, it knows who should be asking me about what, and if they matter. If my boss asks me why an important project is running awry, my computer should recognize that and pause whatever I'm watching and bring important information to my attention. I'm talking about networking that just works. I'm not talking about DHCP and figuring out 802.11b encryption keys when I walk into any Starbucks. And I'm sure not talking about VPNs and sorting out how to remotely mount a file system at a friend's house so I can get at an MP3 that he really needs to hear.

No, I mean sitting down at his computer and telling it who I am and then it connects to my machines, finds what I want, and plays the music. Yes, I'm talking about a universal login that actually works wherever I am, with whatever machine I'm using, and with whatever technical resources are available to me at the moment. A single system that works on my cell phone and the 90-inch high def screen in my basement and everything in between. And I mean everything: Game Boys, PS2s, stereos, and TVs.

We've been promised our flying cars in the past under countless names. XML? Java? .NET? Bluetooth? TCP/IP? Each promised integration of foreign systems and compatibility over countless platforms. Faster networking and new user interfaces are always being researched. And we keep going back to essentially the same old mouse and keyboard combination that the Xerox PARC folks figured out back before a lot of you were born.

These are the flying cars in the PC universe, and we constantly see progress being made on each of these fronts. Computers get smaller and faster every year. The computing power on my current cell phone blows away the pieces of garbage we thought of as high-end desktops a decade ago. In fact, every single thing I listed here has seen progress made on some level in the last year. But I still don't have my flying car yet. And I'm getting impatient. ▲

We've been promised our flying cars in the past under countless names. XML? Java? .NET? Bluetooth? TCP/IP?

Email me the old-fashioned way at . . . malda@cpumag.com.

Forward Slash

Network-Centric War Games

by Joan Wood

No question but that the most important asset you possess when heading off to participate in a military conflict is physical and mental stamina. After that probably comes good body armor and rigorous training. Now add to the list some gaming and IT chops and you're all set for the next wave.

If you haven't encountered the concept yet, you will. Network-Centric Warfare is the military's take on how near-term future combat will be coordinated and conducted. More than just incorporating massively multiplayer game concepts, it parallels the changes in how we do business—networked rather than isolated—and means that bandwidth may one day save your life.

Battlefield awareness and communications have always been a deciding factor in conflict outcome. Acquisition and analysis of detailed and timely information on such items as potential targets, enemy troop movements, and pending covert actions have enormous impact on the resulting command decisions that save lives and win battles.

When the range of available technology includes things like remote-controlled robots and unmanned aerial vehicles with live video transmission capabilities, suddenly, shooting straight is secondary to the ability to utilize representative location data through a GUI to remotely control a robot vehicle and then interpret the visual and sensor information that is retrieved to meet battlefield objectives. Doesn't it sound like a gamer skill set would at least come in handy there?

In all the sensationalized fuss over game violence, both silly and deserved, other important issues have been overlooked. Now that the military is actively using game technology for training and recruitment, the line only becomes more blurred. But whether or not the gaming industry should be marketing interactive violence to children, and how harmless or damaging that element may be to individuals and society, games are here to stay; they influence the design of almost every information and multimedia device, and being fluent in their various control and interface methods is just another aspect of modern life.

Something that has occurred to many gamers (but generally goes unnoticed by the general population), is the infusion of game mechanisms and technology into everyday activities. From the thumbstick-controlled menu systems common in mobile phones, TV remotes, and navigation devices to the ever-increasing complexity of real-time Monday night football stats, game menus have exerted a profound influence on how information is packaged and presented. Game controls and GUIs are integrated into our lives, and occupations that require a quick and accurate assessment of multiple streams of complex data have the most to gain from this integration.

Which brings us back to first-responders, the military, and from where did all this come? Are games feeding military technology, or is it the other way around? If you investigate the number of game developers migrating between simulation and game development, you start to get a picture that looks more like cross-pollination than parallel development. Cutting-edge interactive 3D graphics only happen in a few places, and if that is what blows your dress up, that's where you'll be.

My six nephews have grown up with gaming culture. Their interest in gaming ranges from almost none to aspiring game designer, with avid gamers sandwiched in between. Two have become firefighters, one has joined the military, and the youngest is wrestling with third grade. I'm glad they have been exposed to games (though their parents haven't always been too keen on it) and computer technology because each will have to make his way in a world that increasingly relies on cryptic, graphical representations of complex, abstracted information to communicate real-world situations. It isn't how well you play the game anymore; it's how completely you've managed to integrate the user interface concept into your worldview. ▲

Starting as gopher for the Emmy-winning team that pioneered live in-car TV cameras for the Indy 500, Joan became an independent video/sound engineer, technical director, and producer. Playing with Reality Engines and motion platforms led to co-founding Xatrix Entertainment, where she produced the two Cyberia games. Before 3D acceleration was trendy, she formed Mango Grits to develop hardware-only game Barrage for Activision. Since cashing out from SharkyExtreme.com, where she was co-founder and managing editor, Joan has retired.

It isn't how well you play the game anymore; it's how completely you've managed to integrate the user interface concept into your worldview.

Abstract joan@cpumag.com

ROAD Warrior

by Jen Edwards

New Vonage VoIP Phones, TimeTrax Does iPod, Cell Phones & DNA, Cingular's New 3G Network & More From The Mobile Front

New Phones For Vonage Users

Subscribers to Vonage's low-cost VoIP phone service will be glad to learn that the company has plans to release a new handset that will let users make telephone calls from any Wi-Fi hotspot, in addition to home and work networks. The F-1000 phone, manufactured by UTStarcom, is still in the prototype stage, but it is expected to be widely available by spring or summer this year.

In related news, Vonage has also partnered with phone maker VTech to create a cordless phone that will work seamlessly with Vonage's VoIP service. The ip8100-2 system comes with two handsets and a base station that plugs directly into the user's broadband router. The phone operates in the 5.8GHz frequency, which will not interfere with existing Wi-Fi 802.11 wireless networks. Like the F-1000, look for this phone sometime around spring or summer. No pricing information for either phone was available at press time. ▲

TimeTrax Turns iPod Into Satellite Radio Recorder

TimeTrax has created a small docking station that will let iPod owners schedule and record satellite radio broadcasts directly to their iPods. With the TimeTrax Connect, XM Satellite Radio subscribers will be able to record broadcasts to the iPod at any time and then listen to the recordings when it is more convenient. Users can also save the files directly to their systems as MP3 or WAV files and burn them to CD/DVD. In an apparent attempt to prevent widespread piracy, the serial number of the software will be embedded in each file so that it can be tracked to the person who made the copy if it's uploaded to file-sharing networks.

If you're in the market for a new automobile this summer, Ford and Sirius Satellite Radio have announced as many as 21 models will have built-in Sirius service.

In other satellite radio news, Ford and Sirius Satellite Radio have announced a partnership that will bring Sirius service to as many as 21 different Ford vehicles. Instead of purchasing the required car kit separately and local technicians installing it, the new Sirius service will be a factory-installed option. The deal is expected to bring in as many as 1 million new Sirius satellite radio subscribers within the next two years, giving new credence to the idea that satellite radio subscription services are here to stay. Look for the option to be available this summer. ▲

Cingular Tests New Network, Announces New BlackBerry Phone

Cingular has been conducting tests on its new 3G network (in cooperation with Lucent), and the company has reportedly been able to achieve sustained speeds of 3Mbps. The HSDPA (High-Speed Downlink Packet Access) network should be able to provide throughput of up to 14Mbps, but that has not been tested with this new technology yet. The new network should be available later this year.

Cingular has also announced it will release its own phone from RIM's BlackBerry 7100 series. A previous 7100t (shown here) was released exclusively for T-Mobile users, as was a 7100v for Vodafone users. The 7100g will reportedly feature a half-sized keyboard with two letters on each key. Predictive text software will enable the phone to guess which letter you want to enter with each key press. Additional features include a quad-band GSM/GPRS radio for worldwide use, Bluetooth wireless networking, and a 260 x 240 LCD screen. It was still unknown at press time if the BlackBerry 7100g will work on Cingular's new high-speed 3G network or if the phone will only operate on the company's existing network. ▲

Do Cell Phones Harm DNA?

Most people would agree that talking on a cell phone while driving is potentially dangerous. Now there are new arguments emerging that indicate merely talking on a cell phone can also be hazardous to a user's health. According to a four-year Reflex study funded by the European Union, radiation from cell phones can harm the DNA in human and animal cells. The study was done by 12 research groups in seven countries. Under lab conditions, cells exposed to electromagnetic radiation, similar to what cell phones emit, were found to have a substantial increase in DNA strand breakage, which the cells weren't subsequently able to heal on their own. This cellular mutation is a possible cause for cancer, although much more research under real-world conditions still needs to take place.

Cell phone manufacturers have repeatedly stated there is no evidence of any health risks associated with electromagnetic radiation emitted by cell phones. A recent survey by the International Telecommunication Union states that more than 1.5 billion people use mobile phones, roughly equivalent to one quarter of the world's population. The largest surge in use has been in developing countries such as China, Russia, and India. Estimates suggest that 650 million mobile phones will be sold this year, and that revenues from mobile phone customers are expected to surpass those from landline phones for the first time by year's end. If you're concerned with the health risks associated with cell phones, experts suggest avoiding cell phone use when possible by using a landline phone, as well as by using a headset instead of holding the phone to your ear for a long period of time. ▲

A New Wave Of Consolidation

The palmOne Treo 650 is just one example of a device consolidating many functions into one unit. Another type of consolidation now appearing, has major service providers trying to become all-in-one solutions for their customers' communication needs. For example, Comcast offers high-speed Internet and cable TV access. SBC Communications offers Cingular Wireless service, DSL Internet access, and local and long-distance phone service. Such consolidation offers users one bill and one point of contact for technical support and customer service concerns.

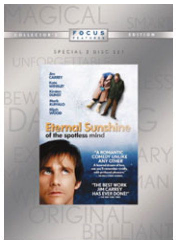
Recent reports have Time Warner and Sprint possibly offering cell phone service to Time Warner customers. Last year, Sprint merged with Nextel Communications, creating Sprint Nextel, which has about 40 million subscribers. Sprint also operates a service with Virgin, targeted at younger users. Time Warner and Sprint aren't offering many details, but a limited trial of the service is expected in Kansas City, Mo., in Q1. One report has Sprint handling mobile phone service and Time Warner handling customer service and billing. Such a deal would make Time Warner the only major cable TV company to offer cable TV, broadband Internet, and wired and wireless phone services. Time Warner reportedly has 11 million cable television subscribers. ▲

Compiled by
Samit G. Choudhuri & Chris Trumble

At Your Leisure

The entertainment world, at least where it pertains to technology, morphs, twists, turns, and fires so fast it's hard to keep up. But that's exactly why we love it. For the lowdown on the latest in PC entertainment, DVDs, consoles, and just stuff we love and recommend, read on.

A/V Corner *Movies by Samit & Music by Blaine*



$29.95
Universal Studios
www.eternalsunshine.com

Eternal Sunshine Of The Spotless Mind (Collector's Edition)

This story of love, loss, and one man's attempt to hang onto the fading memories of his beloved is like willingly sinking into a hazy sea of delicious confusion. Fans of Charlie Kaufman-penned movies ("Being John Malkovich") will be shoe-in fans, but even casual viewers will want to take a closer look. Jim Carrey finally found a dramatic role that works for him, and the lovely Kate Winslet warms the screen every time she steps into scene. The extra disc will delight fans with plenty of extras.

$24.95
Columbia Tristar
www.sonypictures.com/thefifthelement

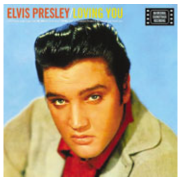
The Fifth Element (Ultimate Edition)

One of the most memorable sci-fi films (starring Bruce Willis, Milla Jovovich, Gary Oldman, and Chris Tucker) of the past decade gets its third treatment on DVD. We're not fans of constant DVD reissues, but this is the version to own if you don't already have this film in your video library. Video is the same reference quality found on the previous Superbit release, but you now get a second disc of worthwhile extras. The subtitle trivia on disc one sets a benchmark for DVD trivia tracks.

$13.50
Zoe Records
www.rounder.com

Shivaree—"Who's Got Trouble?"

We don't know about you, but the woman of our dreams would be as mystifyingly hypnotic as a David Lynch film. She would have an ultra-fetching voice that's three parts angelic, one part demonic. She'd be in a band, and she'd have a name like Ambrosia Parsley. Now you can understand why Shivaree is our new favorite band.



$12
BMG Heritage
www.bmgsmg.com/BMGheritage

Elvis Presley—"Loving You"

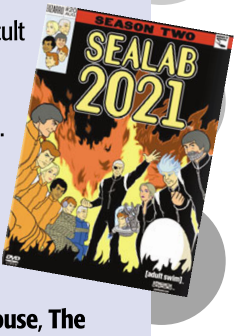
The post-holiday season is typically the dregs for new music, and 2005 isn't an exception. Thank the music gods for reissues. "Loving You," originally released in 1957, was Elvis' third No. 1 album in a row for RCA. This re-release coincided with what would have been his 70th birthday and features remasters in DSD technology and eight bonus tracks. Long live the King.

See the full reviews from A/V Corner at www.cpumag.com/cpumar05/AYL

DVD Byte

by Todd Doogan

The year is already flying by. Feb. 1 brings us a new special edition of the Costner/Huston hit **The Bodyguard**. You'll also find an SE of **Chariots Of Fire**, Buffy in **The Grudge**, Bernie Mac in **Mr. 3000**, and Oscar hopeful Jamie Foxx as **Ray**. Those looking for love can choose between **She Hate Me** and **Shall We Dance**. And finally, it's a good month for TV products on DVD: Cartoon Network's **The Brak Show: Volume 1**, **Charmed: Season One**, **Cheers: Fourth Season**, **Frasier: Fourth Season**, **Sealab 2021: Season Two**, and cult fave **Wonderfalls: The Complete Viewer Collection** all street today. And if that wasn't enough TV for you, the 8th brings **Chappelle's Show: Season 2**, **Deadwood**, **The Fresh Prince of Bel Air**, **Full House**, **The Greatest American Hero**, **The Jamie Foxx Show**, **The Mad About You Collection**, **Murder One: Season One**, **Murphy Brown**, and **The Wayans Bros.: The Complete First Season**. Those of you not interested in TV can look forward to special editions of **Malcolm X** and **Raging Bull**. Oh, and Dreamwork's **Shark Tale**. The 15th is rather light with **Angel: Season Five**, the director's cut of the cult hit **Donnie Darko**, and the awful, awful **Taxi**. Finally, nothing too interesting comes out on the 22nd. A special edition of **Get Shorty**, in time for the sequel **Be Cool**, **I Heart Huckabees**, and FX's **The Shield: Season 3** streets as Season Four broadcasts on TV.



Sid Meier's Pirates!

Scurvy-Free Swashbuckling

Welcome to Atari's remake of MicroProse's classic 1987 Sid Meier game. It's not often you get a lighthearted action-strategy-RPGer that knocks down gaming borders while proving to be fiendishly addictive. The game, released just before the year-end, arrived with little fanfare and quickly became one our favorites for 2004; Sid Meier's Pirates! earned its spot as one of the 10 best PC games of the year. (An Xbox version is anticipated in May.)

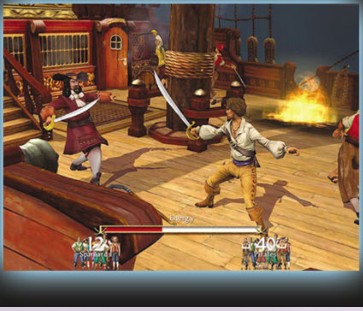
What makes Pirates! such a joy is that it's very easy to pick up, but quite challenging to master. The open-ended gameplay gives the game plenty replay value and you can spend 30 minutes with it just as easily as a solid five hours. In that time you'll explore the Caribbean, make strategic movies, fight on the open ocean, improve your sword-fighting skills, and even dance with some pretty ladies.

The strength of the original game design has been retained with all-important updates for the modern PC. It's not often you get a game that can be enjoyed by the entire family, but Pirates! is one you can even get your kids playing (knowing that all playing parties may actually walk away learning something is just icing on the cake). ▲

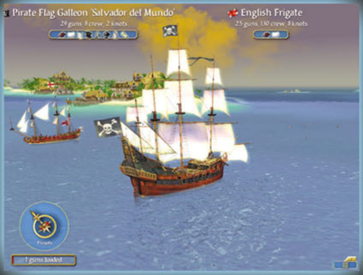
$49.99 (PC) • ESRB: (E)veryone

Atari
www.atari.com/pirates

Where's that rapier wit, eh?



Ahoy, fight for yer oranges, lads!



MechAssault 2: Lone Wolf

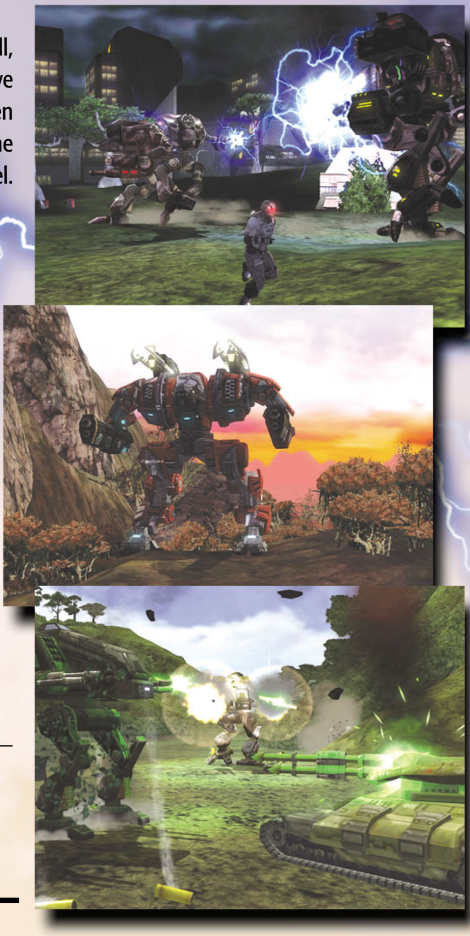
Premium Action Gaming For Xbox Live

More than two years have gone by since we fell in love with Microsoft's original MechAssault on Xbox Live. Nearly every aspect of this sequel is bigger and better than the original. Graphics have visibly been improved, the new game perspective is easier for maneuvering your 40-ton mech around, and you get a much better sense of scale as you tramp around destroying things.

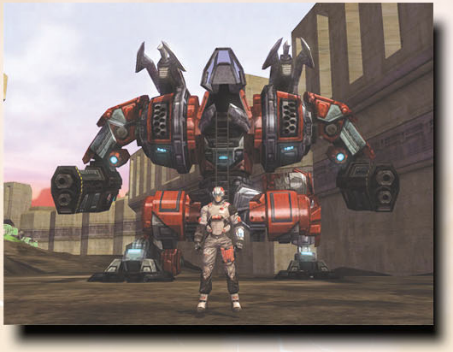
One of the coolest new features in the game is the BattleArmor, which is only slightly larger than a human pilot. With the BattleArmor on you can jump onto an enemy mech, hack into it, and take it over. The smack talk you can lay on an enemy after successfully hacking his mech is pleasure in itself.

The new single-player campaign seems a bit easy and didn't come across as very challenging; it also falls on the short side. Play though the 26 missions one time and you'll have trained well for the multiplayer game. Make no mistake, online is where Lone Wolf truly shines. Those of you without Xbox Live would do better to rent the game for a week. ▲

As you can tell, graphics have very visibly been improved in the sequel.

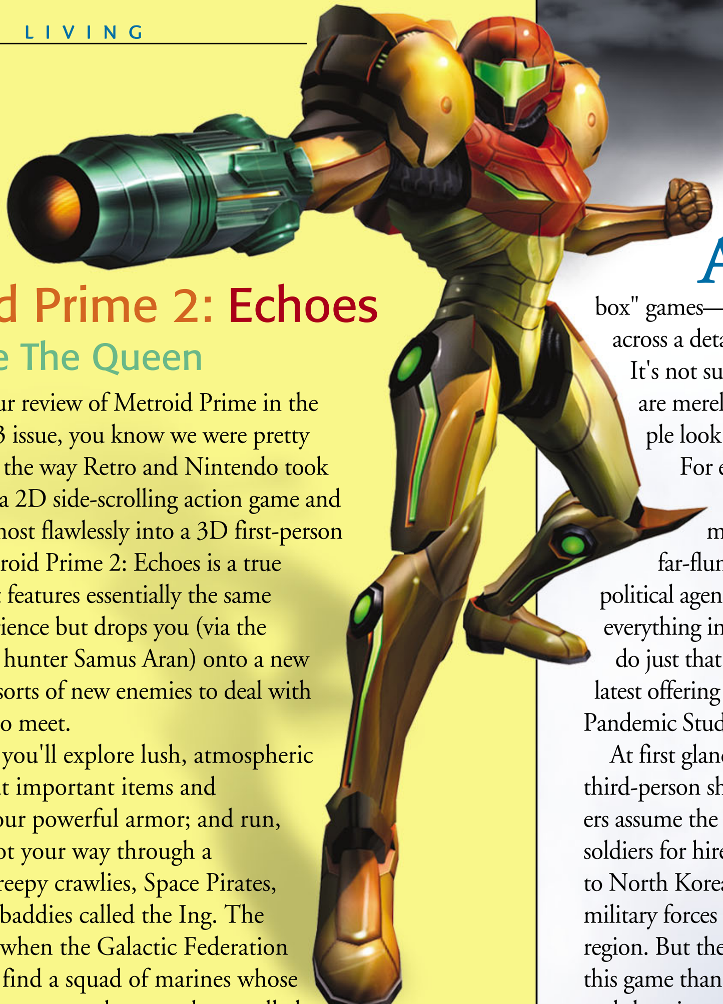


Prepare to pilot 40 tons of weaponry.



$49.99 (Xbox) • ESRB: (T)een

Microsoft Game Studios
www.mechassault2.com



Metroid Prime 2: Echoes

Long Live The Queen

If you saw our review of Metroid Prime in the March 2003 issue, you know we were pretty impressed with the way Retro and Nintendo took what had been a 2D side-scrolling action game and translated it almost flawlessly into a 3D first-person adventure. Metroid Prime 2: Echoes is a true sequel in that it features essentially the same gameplay experience but drops you (via the famous bounty hunter Samus Aran) onto a new planet with all sorts of new enemies to deal with and new allies to meet.

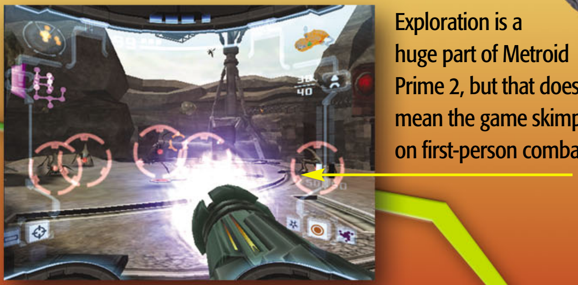
That means you'll explore lush, atmospheric locales; seek out important items and upgrades for your powerful armor; and run, jump, and shoot your way through a menagerie of creepy crawlies, Space Pirates, and some new baddies called the Ing. The game kicks off when the Galactic Federation hires Samus to find a squad of marines whose ship went down on an unknown planet called Aether. Samus takes the job and heads to the planet, where she finds the wreckage of a Federation ship, a squad of dead marines, and a conflict raging between two alien races.

It seems a cataclysmic event has opened a rift between two dimensions, and the evil Ing are pouring through the rift between Dark Aether and Light Aether and working to steal the light world away from the peaceful Luminoths. Samus elects to help the Luminoths, and the action begins in earnest.

Metroid Prime 2 is a blast to play. There are a couple of control elements that take some getting used to if you're accustomed to the standard console FPS control set, but Samus and the world she explores are so cool you won't mind the effort required to do so, and the game is breathtaking in every other way. This is by far the best GameCube game to hit the shelves during 2004. ▲

ESRB: (T)een • Nintendo

$49.99 * NGC
www.nintendo.com



Exploration is a huge part of Metroid Prime 2, but that doesn't mean the game skimps on first-person combat.

Mercenaries

Sandbox Of Death

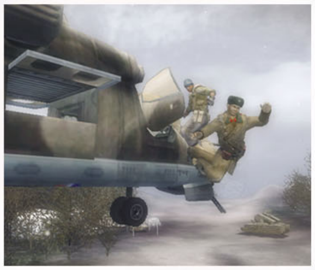
As the Grand Theft Auto games have repeatedly shown over the past few years, gamers love "sandbox" games—games that give them the freedom to roam unfettered across a detailed, "living" landscape and do whatever they want. It's not surprising, really, when you consider that video games are merely the latest and most high-tech form of escapism; people look to games for experiences they can't have in real life.

For example, most of us can pretty safely say that we'll never be highly trained mercenaries sent to far-flung lands to further political agendas by blowing up everything in sight. But you can do just that in Mercenaries, the latest offering from LucasArts and Pandemic Studios.

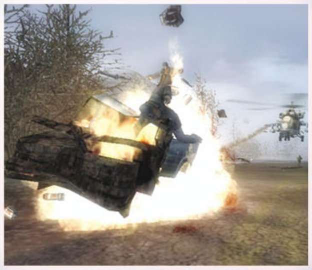
At first glance, Mercenaries is a third-person shooter that lets players assume the role of one of three soldiers for hire who has been sent to North Korea to eliminate rogue military forces destabilizing the region. But there's much more to this game than running around and shooting enemy troops. In Mercenaries, you can pick up and use any weapon you find on the battlefield. (There are more than 30 real-world weapons in the game.) What's more, you can enter and drive or fly any vehicle you can find, hijack, or have lifted to you, including everything from old-school army jeeps to tanks and Comanche helicopters. (There are more than 30 real-world vehicles, too.)

In other words, if you can see it, you can use it, and that makes this game so much fun to play that most players will be surprised just how addictive Mercenaries can be. Of course, even the best premise doesn't equal fun if the game's interface, graphics, and sound aren't up to the task, but Mercenaries gets high marks for technical merit, as well.

If you've ever played a combat video game and wished you could call in a massive air strike to even the odds (and who among us hasn't?), give Mercenaries a try. That's an order, maggot! ▲



Tired of fighting on foot? No problem. Just find a vehicle you want, throw the pilot or driver out . . . and start blowing stuff up.



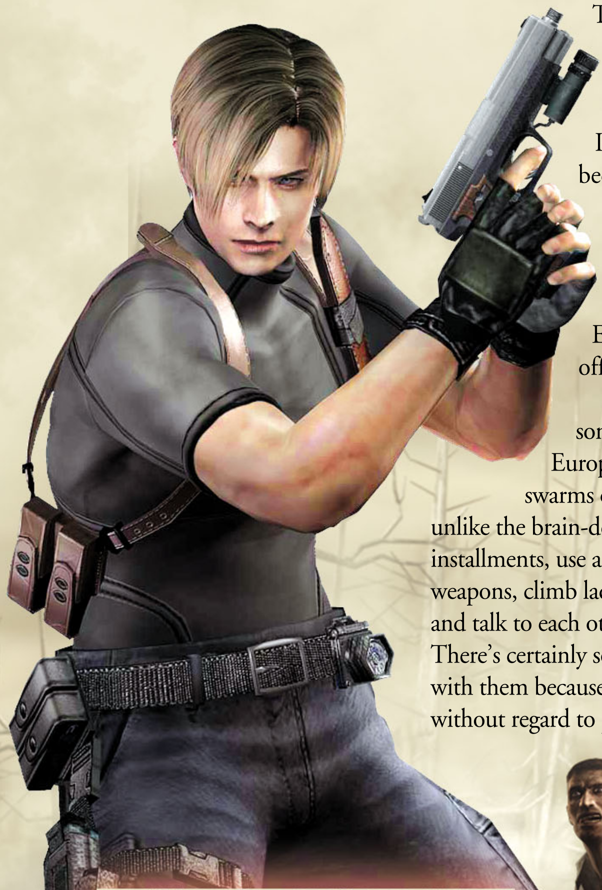
ESRB: (T)een • LucasArts

$49.99 * Xbox, PS2
www.mercenariesthegame.com

4 resident evil

Rural Europe On 1,000 Bullets A Day

We've been huge fans of Capcom's Resident Evil series since the day back in 1996 when the first chapter hit the PlayStation, so naturally we were anxious to see what Resident Evil 4 had in store for us. We'd heard the rumors that the game took the series in a new direction, one without zombies, mutated Dobermans, and the Umbrella Corporation, and truth be told we were a bit nervous. After playing the game, however, we're happy to report that despite a few changes here and there, RE4 is everything fans have come to expect from the first name in survival horror—and considerably more.



The story takes place six years after the U.S. government nuked Raccoon City to stop the spread of Umbrella's hellish virus outbreak. In the time since then, Umbrella has been destroyed and Leon Kennedy (Raccoon City cop for a day and hero of RE2) has become a federal agent. When the president's daughter goes missing and is sighted somewhere in Europe, Leon gets the call and heads off to find her.

His search takes him to a tiny village somewhere referred to only as "rural Europe," where he is savagely attacked by swarms of angry locals who, unlike the brain-dead zombies of past installments, use all manner of crude weapons, climb ladders, open doors, and talk to each other in Spanish. There's certainly something wrong with them because they charge Leon without regard to personal safety or his superior firepower, but zombies they ain't. As a result, you can't simply run into a new room or up some stairs and catch a breather, and this makes for a frightening new RE experience.

Perhaps our favorite change, however, is the way RE4 sheds prerendered backgrounds and fixed camera views in favor of 3D backgrounds rendered on the fly and the freedom to look anywhere you want. When moving around in RE4, you'll view Leon's surroundings from behind and slightly above him; press the R trigger to ready Leon's primary weapon (or the L trigger to ready his knife), and your view zooms in just behind his shoulder.

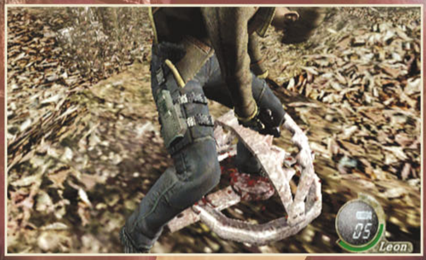
Capcom also added a new control element via RE4's event system, which lets you perform certain contextual actions (opening doors, climbing ladders, etc.) using the GameCube controller's A button, and that prompts you to press particular, randomized button combos quickly to avoid some very nasty hazards.

We liked Resident Evil 4's tweaked play mechanics quite a bit, and its excellent graphics and sound (including some excellent voice work) are by far the best in the series to date. Of course, no RE game would be complete without a passel of fantastic boss battles, and RE4 delivers in this regard, as well. The game's fresh, compelling story brings everything together, creating a gaming experience that longtime fans and RE newbies alike will flat-out love. Oh, and good news for PS2 owners: RE4 is headed your way by the end of this year. ▲

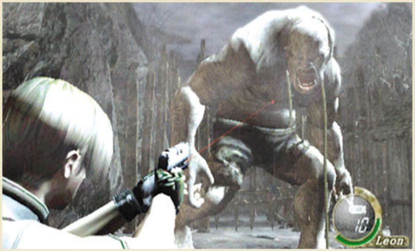
ESRB: (M)ature • Capcom

$49.95 * NGC, PS2 (Q4 of 2005)

www.capcom.com/re4



There are huge traps and explosives rigged with trip wires all over the place.



Meet your new pal, El Gigante.

GAMES OF THE YEAR

PC-CD

Half-Life 2 (Sierra Entertainment)

The past year was a landmark for big-name releases (Doom 3, Unreal Tournament 2004, etc.), but as we noted on page 94 last month, Half-Life 2 took the top spot. It doesn't quite hold up to the gameplay of the original and has an irritating installation process, but otherwise pulls off all the major elements of a great game in top form. Half-Life 2 got us engrossed early on and maintained our suspension of disbelief throughout. Don't miss it.

MICROSOFT XBOX

Halo 2 (Microsoft Game Studios)

Now really, does this come as any surprise after seeing our glowing review on page 96 of the January issue? Halo 2, like Half-Life 2 on the PC, arrived amidst massive hype—and lived up to it. The game features an involving single-player campaign and unending hours of entertainment via Xbox Live. We're already gearing up for Halo 3.

SONY PLAYSTATION 2

Grand Theft Auto: San Andreas (Rockstar Games)

There were lots of great PS2 games in 2004, but at the end of the day we'd rather be in San Andreas than any other game world. Carl Johnson's story was great, but the real draw was roaming San Andreas' three huge cities, populated with people who walk, talk, and drive, among other things. Radio Los Santos!

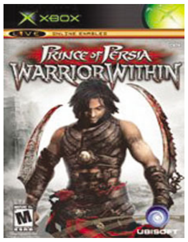
NINTENDO GAMECUBE

Metroid Prime 2: Echoes (Nintendo)

It should come as a surprise to no one that a Nintendo game was the best GameCube title of 2004, but Metroid Prime 2 is every bit as good as its predecessor, which we think is the best NGC game of all time. Samus Aran is still the coolest bounty hunter in the galaxy, too. (Sorry, Boba Fett.)

MULTIPLATFORM

Prince Of Persia: Warrior Within (Ubisoft)



Although we think this franchise lost a bit of its charm in following the herd and becoming darker and "grittier," we can't deny the absolute coolness of the game's combat system and the tightness of its controls. When it comes to 3D combat platformers, the Prince is a king among men.

RUNNERS-UP

Worlds Of Warcraft (Blizzard) comes in a close second as the RPG that the non-RPG masses can fall in love with (it also happens to be an MMORPG that provides plenty for individual gamers); we prefer it to the also excellent EverQuest II. **Rome: Total War** (Activision) comes in third and continues to impress us many months after its release. **The Sims 2** (Electronic Arts) shown through with improvements on the best-selling game of all time and fifth is **Far Cry** (Ubisoft), which had us at "Hello" with its gorgeous outdoor locales.

The ultra-challenging **Ninja Gaiden** (Tecmo) easily takes the second spot to Halo 2 with its superb transition to 3D and essentially flawless combat system. **Tom Clancy's Splinter Cell: Pandora Tomorrow** (Ubisoft) comes in as the third-best Xbox game of 2004. The developers introduced a plethora of new moves in the single-player game and innovated in the realm of multiplayer via Xbox Live and they might just repeat their feat with Chaos Theory this spring.

Ratchet & Clank: Up Your Arsenal (SCEA) wowed us yet again this year, proving that Insomniac's formula for success (cool characters + over-the-top weaponry + zany sense of humor = FUN) is still a valid one. And coming in a very close third was Hideo Kojima's latest masterpiece, **Metal Gear Solid 3: Snake Eater** (Konami). We're not sure where Snake was hiding all that camouflage, and we don't care.

The follow-up to the 2003 sleeper hit Viewtiful Joe, the aptly named **Viewtiful Joe 2** (Capcom) is a slice of 2D heaven. Anybody who cut his teeth on side-scrolling action games back in the '80s needs to play this game. To anybody who didn't: Have your mom take you to the mall and get a copy today. Last but not least, **Tales Of Symphonia** (Namco) was a sight for sore eyes for RPG-loving GameCube owners.

ESPN NFL 2K5 (Sega) is simply the best NFL game ever made. It looks and plays better than the other guy (Boom!) and came out at less than half the price (Whap!). We love what developer Visual Concepts did with the NFL, and we hope that somehow there's more to come. Finally, driving games that don't model vehicle damage are a real drag, which probably explains why we loved **Burnout 3: Takedown** (EA Games) so much. It looks great and offers the most spectacular crashes you've ever seen.

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SOFTWARE TIPS & PROJECTS

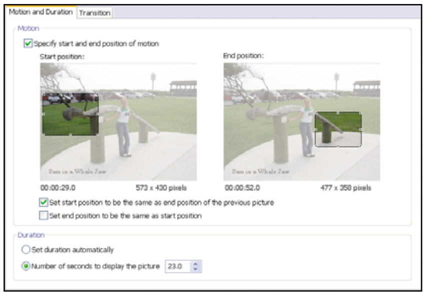
Microsoft Gets Its Photo Story Straight

We PC enthusiasts aren’t in the habit of complimenting the mighty, monopolistic Microsoft too often, but we have to hand it to the rascals of Redmond this time. Their new, and much-improved, Photo Story 3 slideshow processor answers all of our complaints with the previous versions. We now get granular control over zooming and panning, much better output resolution, and the ability to edit saved projects. If you have a ton of digital images from that new camera you got for Christmas, then Photo Story 3 is a terrific way to make and share narrated slideshows that dazzle, rather than bore, your friends and family.

At the Microsoft.com site, type **Photo Story 3** into the search box to find the download link. We’ll let you discover the basics of slideshow creation with PS3, but here are some more advanced tips for getting the most from the program.

Pan, Zoom & Pan Again

PS3 is designed to perform a single zoom or pan motion on each slide, but you can trick the program into exploring a single image with multiple camera movements. At the Import And Arrange Your Pictures step, import several instances of the same image so that you have consecutive copies in the film strip below. Highlight the first image on the film strip and click Next twice to get to the Narrate Your Pictures And Customize Motion step. Click the Customize Motion button and then click the box for Specify Start And End Position Of Motion. Use the sizing/positioning handles to designate your camera’s start point in the left window and the end point in the right window. In the Duration box, you can set the time that this initial movement will take.



☑ Specify start and end position of motion

00:00:29.0 573 x 430 pixels

00:00:52.0 477 x 358 pixels

☑ Set start position to be the same as end position of the previous picture

☐ Set end position to be the same as start position

○ Set duration automatically

● Number of seconds to display the picture 23.0

By placing multiple instances of the same image consecutively in Photo Story 3, you can apply several pan and zoom movements to the same image.

Click the Save button to confirm that you want to save the changes and then click the Close button. In this second instance of the same image, click the Specify Start And End Position Of Motion box. This time, however, also click the box labeled Set Start Position To Be The Same As End Position Of The Previous Picture, which will set your start point in this second image to the precise size and location as the end point of the previous frame. In the Transition tab, uncheck the Start Current Picture Using A Transition box. The combination of these two settings will ensure a seamless transition between the frames. Back in the Motion And Duration tab of this second image, you can now position and size the end point for this part of the sequence.

Using this method across any number of instances of the same image, you can change a single slide into a storytelling device. This is the kind of effect that works well with high res images of complex scenes because you can zoom into small areas of the image without suffering too much pixelation. It is also great to try with group photos with multiple faces—you can have the camera stop and dwell on individual faces in synch with voice narration.

A More Moving Title

PS3 lets you insert titles onto your slides, but you can also create more elaborate animated title sequences by importing premade titles from a paint or draw program. For instance, we’ll make a sequence that fades in the title “A Girl and Her Bird” a phrase at a time. To do this, we will create a title sequence of three separate frames; each frame will show a new part of the full title so that when they appear in a sequence in the PS3 slideshow they will look like an animated title. Open Microsoft’s Paint program and use the text tool to place the first part of your title on a blank page (“A Girl”). This will be our first frame (or slide), so save it as Title1a.bmp. Now insert

WinXP Tip Of The Month

A Wizard Makes Web Slideshows

If you want to post a slideshow to your Web site without having to go through any coding muss and fuss, then go directly to the Windows XP PowerToys page to download the HTML Slide Show Wizard at www.microsoft.com/windowsxp/downloads/powertoys/xppowertoys.mspx. Launch the program and it will walk you through how to create a slideshow of your digital images. The wizard prompts you to browse your directories to collect photos. Once they’re assembled in the window, you can drag and drop them into a specific order. The wizard can make a basic or advanced slideshow, so end users can navigate a film strip of images. ▲

Registry Tweak Of The Month

Lock Down Display Settings

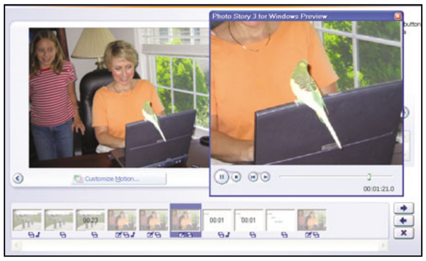
If you administer several office PCs, or you're just a draconian keeper of the family PC, you may want to prevent users from changing their screen resolutions or digging into the details of your monitor and video card settings. This Registry tweak hides the Settings tab in the Display Properties window to make all resolution and monitor settings inaccessible.

In Regedit, go to HKEY_CURRENT_USER\SOFTWARE\MICROSOFT\WINDOWS\CURRENTVERSION\POLICIES. Right-click the key and choose New and Key to create a new key, and name it System. With the new System key highlighted, right-click and choose New and DWORD Value. Name the value NoDispSettingsPage. Double-click this new value and set the Value data to 1 to remove the Settings tab from the Display Properties window. The effect will be immediate. You can restore the Settings tab either by deleting this NoDispSettingsPage value or setting the value data to 0. ▲

---

the next phrase ("and") into the existing image and save that as Title1b.bmp. This second file will be the middle frame (or slide) of our sequence. Finally, insert the end of the title ("Her Bird") into this second image file and save that as a third filename, Title1c.bmp. You now have three BMP image files. Now return to PS3.

Import all three of the Title1*.bmp files into your PS3 storyboard in the right order so that in sequence they create the full title. Use the Next button to move to the stage where you can customize motion. Highlight the first slide in this three slide title sequence and bring up the Customize Motion window. Click the Specify Start And End Position Of Motion box and then click the Set End Position To Be The Same As The Start Position box. This will disable the zoom and pan effect PS3 applies to slides by default, and ensure that the three frames of our title sequence transition seamlessly. Because this frame is only part of a text title, you should set the Duration control to between one and two seconds.



In group shots, you can pan from face to face and add narration to describe each part of the scene.

Advance to the second frame of our title sequence, and click all three of the boxes in the Customize Motion area. This keeps the current slide in synch with the previous frame and disables any zooming effects. Also, match your duration setting on this slide to the first frame in the title sequence. By default, PS3 inserts a transition between slides so, by advancing to the second slide in this title sequence, the phase "and" will seem to fade onto the same slide as "A Girl." Move to the final slide in the sequence and click all of the boxes in the Customize Motion section. For this final slide, you may want to extend its duration to a few seconds to give the full title a little impact. Played together, you should get a seamless, animated fade-in of your title.

Ticker-Tape Title

You can also use the custom panning tool to turn a title into a ticker-tape scroll. In a drawing or paint program, use the text tool to create a one-line title. If possible, center the title so that you have white space to the left of the title about the size of three or four letter characters. We need this space in the slide so that our camera has room to start before the beginning of the word. This works best with short, one- or two-word titles. As with the fade-in title above, save your text image to a BMP or JPEG file that you can import into PS3 (and import two instances of the same title).

Go into the Customize Motion stage of your PS3 project for the first slide of the title and click the Specify Start And End Position Of Motion box. Use the mouse to shrink the panning frame to a bit larger than the height of your title line. Position the frame in the white space to the left of the title. Also, click the Set End Position To Be The Same As Start Position box. In the end position area, drag your panning box into the white space to the right of your title text. For a fast scroll, manually set your duration to about one second.

Move to the next slide, the second copy of the same title. Click the Specify Start And End Position Of Motion box, as well as the Set Start Position To Be The Same As End Position Of The Previous Picture box. Set the duration to about one second. In the Transition tab, uncheck the Start Current Picture Using A Transition box. Save all of this, and you should get a title that scrolls across the full screen and then pulls back to reveal the full title.

You can also do this titling trick using PS3's tool for inserting titles. Every PS3 project has a stage that lets you superimpose titles on existing slides for descriptive purposes. You can create titles without images in PS3 by making blank images in a paint or drawing program and importing them into the PS3 project as blank slides. In the titling stage, simply create the text you want in the right size and center it on the slide. You can now apply any of the pan and zoom techniques to this title, as well. CPU

by Steve Smith

Infinite Loop

See The Music

You'd think Apple's iPod, along with the myriad of other digital music players, would have satisfied most music lovers' cravings. But, if you ask sunglass-maker Oakley, the iPod has nothing on their newest invention—Thump. You got it, it's wireless digital music eyewear. You get 128MB of storage for $395 or 256MB for $495. Where the iPod can hold hours upon hours of music, Thump's 256MB version tops out at 60 songs (about four hours), but the shades weigh less than 1.8 ounces, and a fully-charged battery can give you six hours of playing time.

If you need sunglass style to go along with your tunes, check out Thump. ▲

Source: oakley.com/catalog/eyewear/thump/music/

Warm Up To Penguins

Working With Processes

Knowing what's happening on your system is important for numerous reasons. Maybe you're trying to deduce why your Linux machine is running slowly, or perhaps you're trying to stop a program that won't quit. You could even be trying to figure out if someone has broken in and is running extra routines in the background. No matter the reason, there are some basic techniques that you can use to determine what's happening to decide what to do about it.

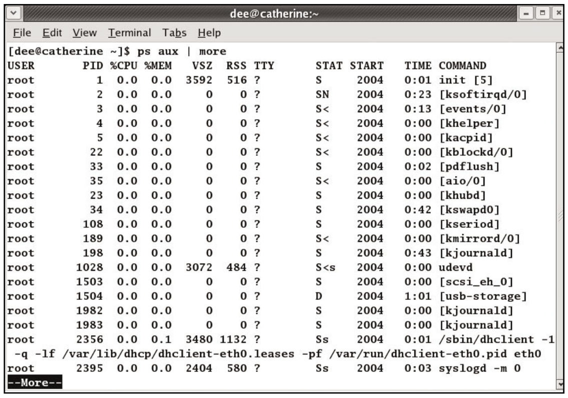
The Commands

When you're hunting down particular processes, there is a collection of commonly used commands available. The most basic, or at least the most commonly used, of these is ps. Typing **ps** alone at a command prompt doesn't tell you much. You'll probably see something like:

```
PID TTY      TIME CMD
27382 pts/1   00:00:00 bash
27401 pts/1   00:00:00 ps
```

From left to right:

- PID is the process ID assigned to the program in question. Every process in Linux has a unique PID. If you run two instances of the same program simultaneously, they will almost always have different PIDs and rarely (if ever) get the same PID twice. The exception is with the init program, which always has PID 1. This is always the first program the kernel starts at boot.
- TTY is based on the original device name (/dev/tty) assigned to terminals, such as command line sessions. This concept can feel a bit nebulous. The best way to get a feeling for what is and isn't a TTY is to type **tty** at a command prompt. If you get a path back, such as /dev/pts/1, you are using a terminal as far as the computer is concerned.
- TIME is the amount of CPU time the process has used.
- CMD is the program being run.



```
[dee@catherine ~]$ ps aux | more
USER       PID %CPU %MEM   VSZ  RSS TTY      STAT START   TIME COMMAND
root         1  0.0  0.0  3592  516 ?        S      2004   0:01 init [5]
root         2  0.0  0.0     0    0 ?        SN     2004   0:23 [ksoftirqd/0]
root         3  0.0  0.0     0    0 ?        S<     2004   0:13 [events/0]
root         4  0.0  0.0     0    0 ?        S<     2004   0:00 [khelper]
root         5  0.0  0.0     0    0 ?        S<     2004   0:00 [kacpid]
root        22  0.0  0.0     0    0 ?        S<     2004   0:00 [kblockd/0]
root        33  0.0  0.0     0    0 ?        S      2004   0:02 [pdflush]
root        35  0.0  0.0     0    0 ?        S<     2004   0:00 [aio/0]
root        23  0.0  0.0     0    0 ?        S      2004   0:00 [khubd]
root        34  0.0  0.0     0    0 ?        S      2004   0:42 [kswapd0]
root       108  0.0  0.0     0    0 ?        S      2004   0:00 [kseriod]
root       189  0.0  0.0     0    0 ?        S<     2004   0:00 [kmirrord/0]
root       198  0.0  0.0     0    0 ?        S      2004   0:43 [kjournald]
root      1028  0.0  0.0  3072  484 ?        S<s    2004   0:00 udevd
root      1503  0.0  0.0     0    0 ?        S      2004   0:00 [scsi_eh_0]
root      1504  0.0  0.0     0    0 ?        D      2004   1:01 [usb-storage]
root      1982  0.0  0.0     0    0 ?        S      2004   0:00 [kjournald]
root      1983  0.0  0.0     0    0 ?        S      2004   0:00 [kjournald]
root      2356  0.0  0.1  3480 1132 ?        Ss     2004   0:01 /sbin/dhclient -1
 -q -lf /var/lib/dhcp/dhclient-eth0.leases -pf /var/run/dhclient-eth0.pid eth0
root      2395  0.0  0.0  2404  580 ?        Ss     2004   0:03 syslogd -m 0
--More--
```

Figure 1. Here, the beginning of a listing of all the programs running on our system is displayed.

With no flags, the ps command only tells you what's being run from this particular terminal. A common combination of ps flags is to type **ps aux** at a command prompt. The "a" shows processes from all users. The "u" tells the system that a user will be reading the output so make it user-friendly. The "x" specifies that you want to see processes that aren't attached to terminals, such as some system processes. This new output will look more like what's shown in Figure 1. The key fields added include:

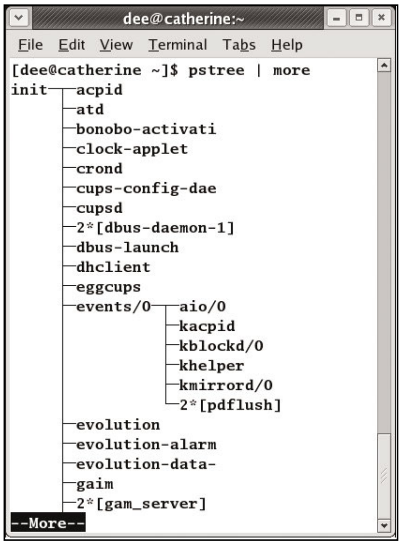
- COMMAND, which is the same as CMD in the previous version.
- USER, which is the user who ran the process or what it's now running as.
- %CPU, which is how much CPU power the process is taking up.
- %MEM, which is how much memory the process is taking up.

If you need to stop a process, it's not always simple. Sometimes, you'll try to end a process, but instead it acts like a Hydra that seems to keep sprouting heads. Type **pstree** at a command prompt and you will see a tree diagram showing which programs started which subprograms, as shown in Figure 2. You'll notice that init is the parent of all processes. (Remember, it always has PID 1.)

There may also be times when you want to know why your system is slowing down. You know a program is probably out of control, but you aren't sure what it is. In this case, open a command line terminal and type **top**. This program will show you a continuous view of what's happening on your system. To make sure you're sorting by CPU usage, press P. To sort by what's using the most memory, press M.

Stop Processes

Once you hunt down a program you want to end, how do you stop it exactly? Typically, the answer is to use the kill program as either the user who started the process or as the root user. Let's say you learn that a program you want to stop is running under the PID 1451. So, you type **kill 1451** at a command prompt and then type **ps aux | grep 1451** to make sure it's gone. Sometimes it is, and sometimes it isn't.



```
[dee@catherine ~]$ pstree | more
init─┬─acpid
     ├─atd
     ├─bonobo-activati
     ├─clock-applet
     ├─crond
     ├─cups-config-dae
     ├─cupsd
     ├─2*[dbus-daemon-1]
     ├─dbus-launch
     ├─dhclient
     ├─eggcups
     ├─events/0─┬─aio/0
     │          ├─kacpid
     │          ├─kblockd/0
     │          ├─khelper
     │          ├─kmirrord/0
     │          └─2*[pdflush]
     ├─evolution
     ├─evolution-alarm
     ├─evolution-data-
     ├─gaim
     ├─2*[gam_server]
--More--
```

The beginning of this diagram shows you which processes started which subprocesses.

If the program is still running, you would typically type **kill -9 1451**. Running kill without any flags is fairly gentle and will properly shut a program down. When you add -9, you're basically telling the system you don't care how many temporary files the program has opened or what it's doing; you want the program stopped in its tracks (which can potentially leave a big mess behind). In other words, kill -9 is only for those times when you can't stop a runaway program any other way.

Sometimes, you'll want to kill multiple programs all running under the same name. For example, maybe someone typed **find / -name bob** five times and your computer is bogged down digging through the file system for files and directories named "bob." As the proper user, typing **killall find** will stop all these instances; it will also stop every other find operation happening on your system. In addition, if you're using a program in a terminal window and it seems to hang, try pressing CTRL-C to do the trick.

Get Programs Out Of The Way

Let's say you don't want to end a program completely. Maybe it's just hogging your command prompt and you want to type things without having to open another window. Press CTRL-Z. This should suspend the program. Once it's suspended you'll see output similar to:

```
[2]+  Stopped          find / -name bob
```

To move this program into the background so it won't hog the prompt any longer, use the number in brackets at the front of the output. For example, you would type **bg 2** to put the program in the background. If you want to start it again and let it hog the prompt, type **fg 2**. It's important to note that this program is still attached to your terminal window. If you close the window, the process will automatically die, which is another handy way to kill a runaway program. If you lose track of how many programs you have suspended, type **jobs** to see a list. To see the PIDs with this output, type **jobs -l**.

If you discover a user is hogging too much of your system's resources, you can actually limit the user's ability using the ulimit command. Typing **ulimit –a** at a command prompt shows your current system limits. One of these limits is:

```
max user processes          (-u) 16382
```

In this output, the maximum number of processes a user can launch at once is 16382. If necessary, you can reduce this value. First, become the root user and then type **ulimit -u *value***, where *value* is the new limit. Notice that the limit will apply to all users, not just the one who's driving you mad.

A less drastic way of dealing with problem users is using the renice command. If someone is running software that's draining system resources, you can type **renice *value* -p *PID*** or **renice *value* -u *user*** to regain control. Here, *value* is the nice level, *PID* is the process ID, and *user* is the account you're trying to limit. Nice levels usually range from 10 (low priority) to -10 (high priority), and you can change the priority level of any program you're running. Only root can change the level of another user's program, and only root can reduce the priority to below 0.

Get Your Process Running

Everything in your system is run by a process, whether it's the kernel or something spawned from the kernel or init. Knowing how to work with these processes is a key skill for all Linux and Unix users. For the most part, this skill will translate between Unix flavors with a few variances here and there. So, the next time a program won't die, you won't be so tempted to reboot.

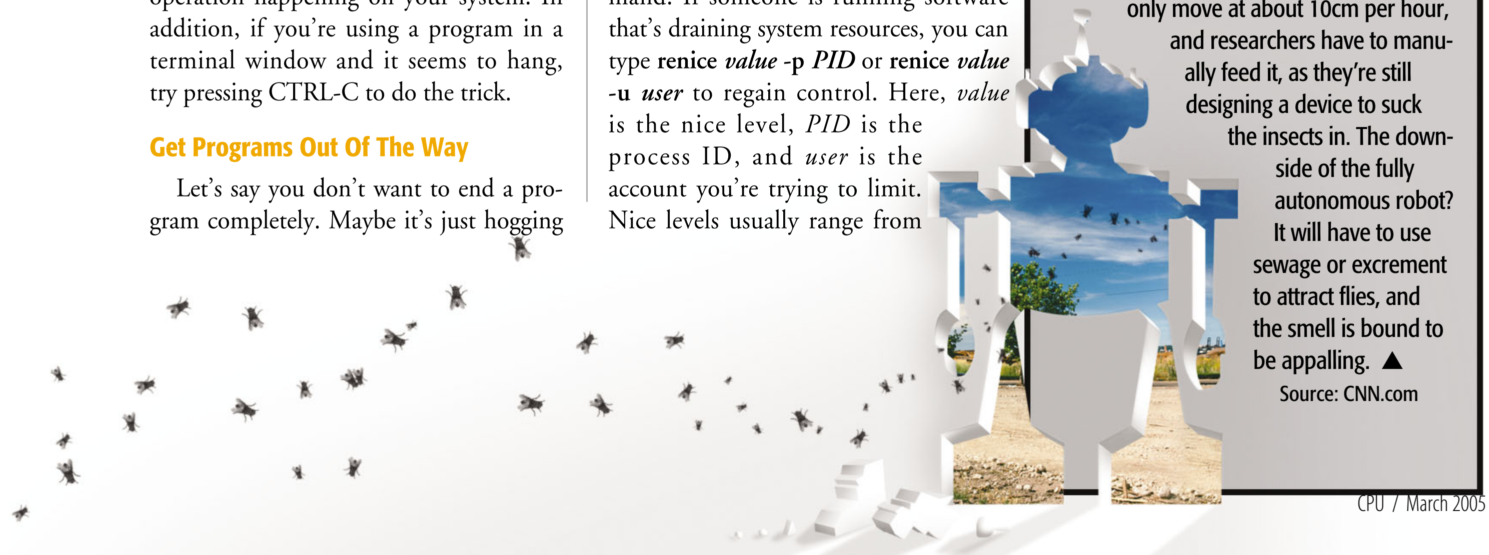
by Dee-Ann LeBlanc

Infinite Loop

Fly Power

Meet EcoBot II, a robot University of West England scientists have created that doesn't require electricity or batteries for power. Instead, EcoBot II gets its power by eating houseflies. The robot is part of a project to create robots that can enter areas too dangerous for humans, such as hazardous industrial or military zones. The idea is to produce electricity by catching and digesting the flies in special fuel cells that break down sugar in the insects' skeletons, thus releasing electrons to drive an electric current. EcoBot II is still a proof-of-concept project, however. It can only move at about 10cm per hour, and researchers have to manually feed it, as they're still designing a device to suck the insects in. The downside of the fully autonomous robot? It will have to use sewage or excrement to attract flies, and the smell is bound to be appalling. ▲

Source: CNN.com



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"GOT EB DDR?"

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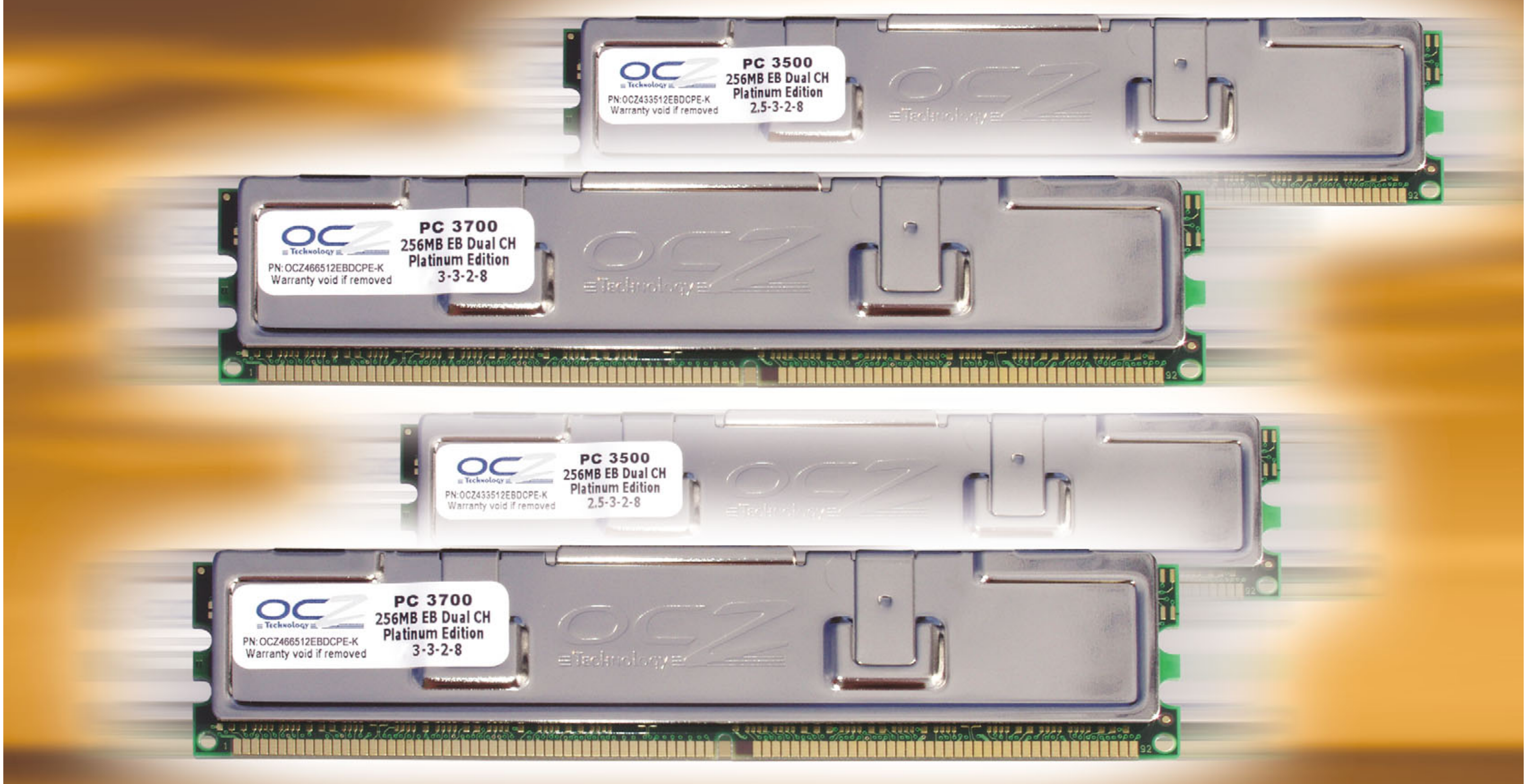

SPECIFICATIONS

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Rumour Mill

Digital Home Can Snare Your Media

by Mike Magee

We all know that Intel and Microsoft are putting a huge amount of marketing money behind pushing the Digital Home, but the feeling on the street is that even the most loyal Wintel partners are just giving lip service to the concept. There's user resistance to the concept, too. A recent HP advert showed a couple on a plane, sharing a very high-end Digital Home style notebook while they watched a DVD together. The machine straddled both of the passengers' trays. The price for this notebook, complete with a widescreen, is in the thousands of dollars. It's nice to watch DVDs on a long plane journey, but do you really need a high-powered beast rather than two dinky little portable players and not have to share? It's good to share, but sometimes it's better to stand alone.

Last year we saw a number of "digital home" style machines at Computex, which is a big Taiwanese PC trade fair. Some of these were really very pretty and would fit nicely in a living room—they looked like consumer devices but are based on PC technology. We've seen a preview of a Shuttle XPC machine which tellingly uses the Pentium M as its basis rather than the Pentium 4. This is because the Pentium M is a low-power CPU that keeps the whirr factor down. No one wants to be irritated by their multimedia center sounding like a helicopter about to land on a set-top box.

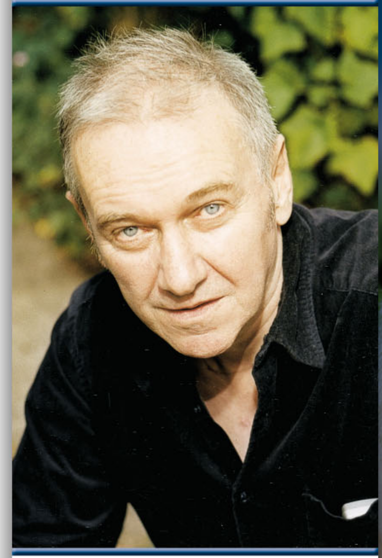
Perhaps nine out of 10 of the manufacturers of these machines had the same beef: They'd like to ship the boxes with Microsoft Media Center, but the premium on the systems was such that they couldn't afford to because the competition was so great. So many manufacturers had bought-in or developed their own versions of multimedia software to achieve the same effect as Media Center Edition. Some of this software looked uncannily similar to Media Center but obviously is not standard because there are loads of different varieties for each piece of kit.

And what is standard in the Digital Home? Those who have the bucks to buy the kit are likely to be reasonably high earners. They may have collected a huge collection of stuff in different formats over the years: Cassettes, vinyl, CDs, VHS, and perhaps even Betamax videos. Wouldn't it be nice to have all of these, in digital format, on one PC in a corner? There are books that can tell you how to do this, but if your collection is large, several more "standards" will probably have been and gone by the time you finish digitally remastering your media.

This is something that Intel and Microsoft don't want to point out, for the rather obvious reason that they want to sell more CPUs and more software. You can't blame them for that.

As regular readers know, in the next two years we're going to see dual-core processors from AMD and Intel and a brand-new Longhorn operating system from Microsoft. This OS will, by all accounts, need a high-end graphics card from ATI or NVIDIA. Does that mean we're going to have to buy different Media Centers that take advantage of these extra features in 2007? And does that mean that all the digital data we have on our old Media Center will have to be transferred to the new ones? It's hard enough to do that on ordinary PCs. Will we have to have a RAID enclosure in the corner of our living room or hidden behind the curtains with additional extra wiring? Granny's reaction to that may be positively murderous.

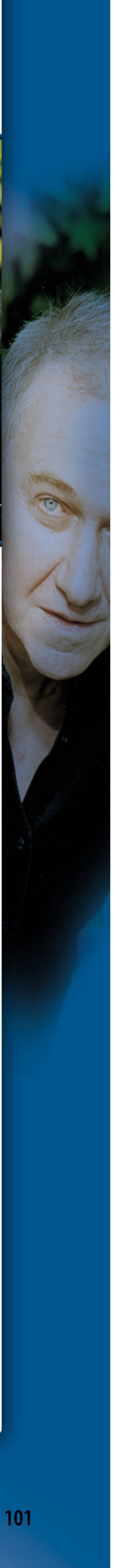
The consumer and the PC industry are converging, but there are some pitfalls to consider. Already you need to be careful when you buy digitial music online, so that you can successfully shift the music from one machine to another. Or would the music and film industries rather we buy our favourite tracks and movies several times every few years, like the CPU makers and the software manufacturers do? They'd love that. ▲



Mike Magee is an industry veteran. He cut his teeth on ancient products like the Dragon and the Japanese PC platforms long before the IBM-PC won. He worked for a corporate reseller in the mid-'80s and saw the Compaq 386 sandwich box and every GUI known to humankind. Mike decided that the way to go was the Interweb around 1994 after editing PC mags in the late '80s and '90s. A co-founder of The Register, Mike started the chip-driven INQUIRER (www.theinquirer.net) in 2001. He has contacts from top to bottom in the business, spanning the entire chain, who help him root out interesting rumours and speculation.

It's good to share, but sometimes it's better to stand alone.

Send rumours to "Mad Mike" Magee at Mike@cpumag.com.



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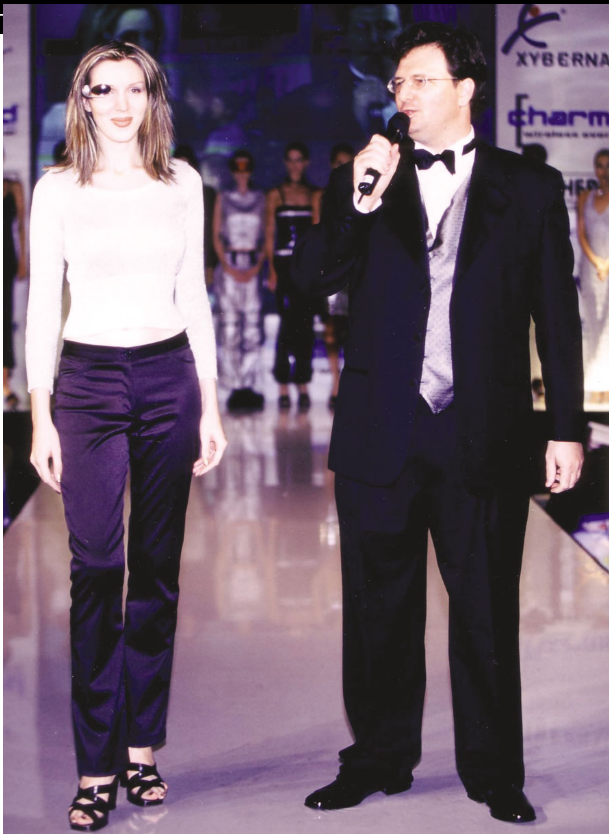
Technically Speaking

An Interview With Alex Lightman, Charmed Technology's Fashion Guru



Now on the runway: wearable computing, as presented by Charmed Technology's Alex Lightman and fashion models.

When you want to help bring a new breed of technologies to the world, the usual path is via corporate or academic research labs, praying for a design breakthrough. Alex Lightman, who graduated from MIT in 1983 as an adviser in the Architecture Machine Group (later the Media Lab), decided to try a different path: fashion shows. To date, wearable computing remains a sci-fi fantasy completely alien to the everyday world. With some help from his MIT colleagues, though, Lightman and his company, Charmed Technology, are working to popularize wearable computing by strutting it down the runway. Is the "chicks with chips" strategy working to influence a technological culture shift? We put Lightman behind the microphone to find out. ▲

by William Van Winkle

CPU: How on earth did you come up with the idea of Charmed and a wearable computing fashion show?

Lightman: Well, at the time it was originally called InfoCharms. MIT had done a one-off event where it had Leonard Nimoy narrate some student designs, but it was basically prototypes. We decided to make a show that was not a series of skits but a real fashion show. So we had real models wearing real designer clothing but also wearing technology. This was in October 1999, and *The New York Times* gave it almost two full pages of coverage, including 10 color photos. I've never met someone who had coverage like that.

That kicked off 102 fashion shows that typically got more publicity than all the other things in the shows put together. We did shows in New York, Singapore, Hong Kong, Seoul, Tel Aviv, Berlin, Paris, London. We've probably had a hundred different companies' and universities' research projects provide things for the show. I have seen the future in the same way that somebody who runs a Hard Rock Cafe has seen rock-and-roll memorabilia. I've sort-of seen the memorabilia of the future, where wearable computers are really common and widespread.

CPU: What are these shows trying to get across to people?

Lightman: We'd like to get them to open their minds to the idea that at some point they might want to wear a computer of some kind, in a new way, in a new configuration, and also that they might want to associate our brand name with it when they buy it. And those are the two purposes of the show.

CPU: Do you have a line of Charm-branded devices?

Lightman: We went out and we sold several hundred wearable computers to a few hundred different customers, but at the same time, we have realized that there are some changes needed, based on new boards, because of heat issues. We haven't started selling CharmIT 2.0. That's going to come out in 2005, and that will be more powerful with less heat.

CPU: When you say a wearable computer, I envision a brick, like something from Xybernaut. Bricks aren't terribly fashionable. Are we talking about two different things?

Lightman: Three different things. We're talking about what's available to now, which is a brick. The second part is research-level devices that are more efficient but maybe not sold in stores yet. And then there's the radical breakthroughs, where you're having wearable computers that you can put in wristwatches, pendants, brooches, bracelets, things like that—the really amazing stuff.

CPU: Given your objectives, do you consider the shows a success?

Lightman: It's the aggregation of an audience that matters. How do you aggregate an audience in wearable computing? The answer that I have found to be better than everything that the world has put together, is to do wearable computer fashion shows along with technology conferences and trade shows. I mean, it's worked around the world. We've never advertised for Charmed, so it is a form of advertisement. And typically the shows break even through sponsorship, so it doesn't cost us anything net to do those shows. There are very few companies that are even break even in wearable computing. Look at Xybernaut's public documents. This is one of those markets where it's better to some extent to go at it a bit more slowly than most. I can tell you this as one of the world's best wearable computer marketers: There is not a huge demand for wearable computing . . . yet. But one day there will be.

There is not a huge demand for wearable computing . . . yet. But one day there will be. —Alex Lightman

CPU: What can we expect out of wearable research labs to reach market in the semi-near future?

Lightman: I expect you to see computers that will integrate the functions of mobile phones and telephones, doing voice over IPv6, videoconferencing over IPv6 with augmented memory, augmented reality—digital overlays on the real world through headset displays—all fitting on something that looks like a fat pair of sunglasses and having all that within the next three to five years. I think you can reasonably expect that.

CPU: But we are getting video over cellular already. Will this next-generation gear be compatible with our current phones and networks?

Lightman: There will be very little overlap. You can have peer-to-peer connections. You're going to have more people doing mobile video and HDTV over IPv6. I'm sorry, but they're going to have to take 99% of their current mobile phones and PDAs and throw them in the trash. Because people are not going to carry more than one object, and you cannot do good video on current mobile technology. And when I say video, I don't mean video like the video you see on TV. I mean a video where you're looking at a city and then you want to overlay an X-ray view of it, then an infrared view, then ultraviolet view of it. Like in that movie, 'Predator 2,' they're trying to fool the predator because they figure out how he sees with heat. They put people in suits and start putting down this radioactive snow. But then the predator just pops up this wearable computer on his wrist and starts cycling through the different ways in which you can look at the electromagnetic spectrum. Just like that we will have the ability to look at different parts of the electromagnetic spectrum. But we will also have new software for real-time processing. You know how with Photoshop you can do different kinds of artistic effects with photos? You'll be able to do that in real-time.

CPU: Can something like a wearable computer honestly be perceived as fashionable? We're only just starting to see cell phones in this light.

Lightman: There are things that you notice, and then there are things that are just perceived at a subconscious level. One of the most fascinating industrial competitions, the kind of thing people will be studying centuries from now, is who won and lost the cell phone wars. Nokia, in the early '80s, made toilet paper and rubber boots and steel cables. Then it started giving its phones colored face plates and putting them in fashion shows. When Nokia did that, it broke out of the pack. There's no natural advantage for people in Finland to be the leaders in a consumer electronics product. This is a very, very big business, and I think it developed, in part, due to fashion.

Said differently, say you're trying to get the Department of Agriculture to use a better method of poultry inspection, and it is wearable computers. Can you think of a better way than to have an audience of thousands of people, maybe even up to 10,000 live, and 20 TV cameras all looking at a gorgeous model in an inspection outfit showing how that works? It's a very simple, elegant way to show that application, along with other ones.

CPU: You don't compete with Xybernaut, but you're also not a fan of its incredibly broad patent portfolio in wearable computing. Why?

Lightman: Because it has this notion with its patents that it owns wearable computing. I have always thought of that as being a problem for the United States because if you end up losing all this money, you simply sell out your company to someone from Asia who then starts coming in and bossing American companies around, saying, 'You can't do any wearable computing.' Potentially, there could be a real big issue with wearable computing if it's as big as I think it will be. It's kind of like an inadvertent Trojan horse. Then, all of a sudden, half the people in the industry have to go back and say, 'Well, no, these patents actually aren't really real patents because all the stuff existed in wearable computing laboratories years before.' Like the torso-worn wearable computer. I mean, who gives a damn whether it's worn on the torso? What does that have to do with anything? The answer is that is not really a patentable thing, but if you don't have a good reason not to give someone a patent, then you just give it to them.

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To read our entire interview with Alex Lightman, go to www.cpumag.com/cpumar05/lightman.

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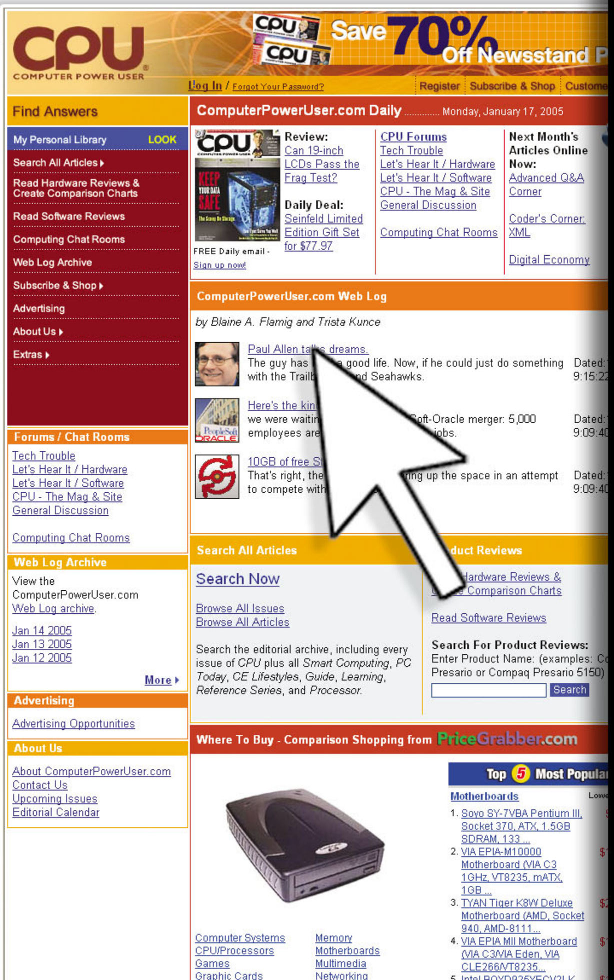

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Under Development

A Peek At What's Brewing In The Laboratory

by William Van Winkle

EAPs (electroactive polymers) can mimic the contractions of biological muscles. But are they ready to take on the real thing?

(Image courtesy of NASA/JPL-Caltech)

We Have The Technology-Almost

Imagine an aircraft that can fly by flapping its wings. Or a prosthetic arm that looks, feels, and performs like the real thing, except that it's stronger and doesn't get tired. These creations may sound sci-fi, but recent advances in the field of EAPs (electroactive polymers) could make them a reality in the not-so-distant future.

EAPs are synthetic materials that can simulate the action of biological muscles by contracting when an electrical charge is applied to them. When the charge is removed, the material quickly returns to its previous position. Because EAPs are made of soft plastic, they are lightweight, malleable, and inexpensive to produce, which makes them a potentially revolutionary replacement for today's motion generators.

The area of biomimetics, or the imitation of the movement of biological creatures, is where Dr. Yoseph Bar-Cohen, a leading researcher in the field who works at NASA's Jet Propulsion Laboratory in Pasadena, Calif., sees the most exciting potential for EAPs.

"Availability of strong and robust artificial muscles may, in future years, enable us to produce biomimetic-legged robots that can run as fast as a cheetah, carry mass like a horse, climb steep cliffs like a gecko, reconfigure its body like an octopus, fly like a bird, and dig tunnels like a gopher," Bar-Cohen says.

Bar-Cohen issued a challenge five years ago to the EAP research community: Develop a robotic arm that is moved by artificial muscles that could defeat a human opponent in an arm wrestling match. Given the state of the technology at the time, he anticipated the challenge might stand unanswered for 20 years. Instead, this March at the SPIE (International Society for Optical Engineering) Annual International EAP Actuators & Devices Conference, not one but two robotic arms will go mano-a-mano with a human. While acknowledging that "the odds are not in favor of these materials" in this first meeting, Bar-Cohen sees the competition as win-win regardless of the outcome.

"Even if the robotic arms lose, the attention that the field will get will challenge more researchers and engineers to participate and hopefully win next time," he says. ▲

A Pocket-Sized Projector

PDA? Been there. GPS? Done that. iPod? That's *so* 2004. If you're a gadget lover suffering from electronics ennui, take heart. A team at Germany's Fraunhofer Institute for Silicon Technology is developing a vest pocket-sized beamer.

The miniature portable projector will be able to display legible text and images on almost any flat surface. Designed to fit inside a cell phone and create a 320 x 240 display, the gadget could project business presentations, maps, or your photos.

The secret is a 1.5mm diameter mirror placed on torsion springs. After the mirror deflects the laser beam, it springs immediately back into place, repositioning itself several thousand times per second. In this way, the projector builds the image one pixel at a time.

This simulation provides a glimpse of the vest pocket beamer.

(Image courtesy of Fraunhofer Institute)

It would seem the device would be very sensitive to bumps, but it's not. Physicist Ulrich Hofmann, one of the projector's developers, states that the beamer has a built-in system of duplicate laser diodes and sensors that compensate for errors caused by external motion.

"If, for instance, the mirror is knocked out of position by unexpected vibrations, the backup laser notices this," Hofmann states in a press release. "The electronics can then respond by adapting the projection data accordingly."

The final product is "likely to be no larger than a cube of sugar," according to a Fraunhofer press release, but the working-demo model is still bulky, awaiting further electronics miniaturization. Also still under development is the light source. ▲

Getting A Grip On Gun Safety

Metal Storm's patented electronic handgun, the O'DwyerTM VLe, will incorporate Dynamic Grip Recognition technology as early as 2006.
(Image courtesy of Metal Storm)

Thousands of people die every year in the United States from people using handguns who should not be, such as children who get their hands on a loaded gun, suspects who disarm a police officer and use the weapon against the officer, or criminals who steal a registered firearm and use it to commit a crime.

Researchers at the New Jersey Institute of Technology are developing a gun that's intended to make those types of scenarios a thing of the past. Circuitry in the gun that runs pattern-recognition software will ensure that only a person known and authorized to use the gun can fire it.

Not so fast, you say. Smart-gun technologies using biometrics—the science of identifying someone based on unique physical characteristics, such as fingerprints—have been available for some time. What makes this scenario unique is the use of a dynamic biometrics, which depends both on a user's physical characteristics and on his behavior. "This is about who you are and how you do something," says Dr. Donald H. Sebastian, senior vice president of research and development at NJIT.

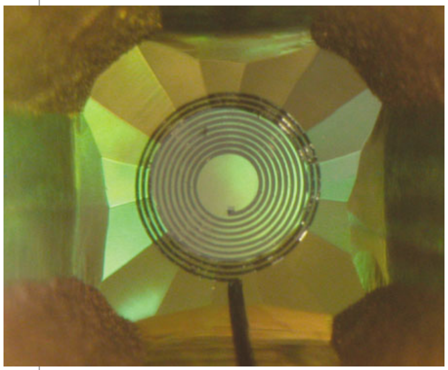
Dr. Michael Recce invented the technology, known as Dynamic Grip Recognition, at NJIT. The technology uses sensors in the handgun's grip to measure not only a user's hand size, strength, and structure, but also the size and force of the hand at the moment the trigger is pulled. This pattern is compared to that of authorized users, and if a match is made, the gun fires.

Results during a recent demonstration were impressive. "We've only just begun, and we're pleased to say that we're getting 90% reliability when scanning users," says Sebastian. To increase that percentage, more sensors will be added to the grip and a backup palm-recognition system is being considered.

For now, the test gun is attached with cables to a laptop running the pattern-recognition software. The next step in the process will be to move the electronics from the laptop to the gun itself. As early as January 2006, the technology will be turned over to Australian-based Metal Storm to be incorporated in that company's patented electronic handgun. ▲

Diamonds: Your Computer's Best Friend?

You're familiar with Moore's Law. You probably also know that Gordon Moore himself has predicted that the law will start to crumble around 2010 as engineers increasingly battle against the laws of physics to shrink processor feature sizes. Never mind quantum electron tunneling and other problems; as the number of transistors on processor dies continues to climb, silicon is expected to reach its heat tolerance limit in about a decade. Some researchers, however, are looking at using diamonds as a possible way to overcome those limitations. The gemstone's properties, including extreme hardness and a very high melting point, would provide a vast improvement over silicon.



Researchers at Lawrence Livermore National Laboratory in California and the University of Alabama at Birmingham have developed a diamond-based microcircuit by embedding a microcoil made of tungsten in natural diamond.

Researchers at Lawrence Livermore National Laboratory in California and colleagues at the University of Alabama at Birmingham, have succeeded in developing a diamond-based microcircuit by embedding a tiny coil of tungsten in a natural diamond. This microcircuit is a sensor designed for probing the electrical and magnetic properties of materials under ultra-high pressures, not a computer microcircuit, which is a more difficult proposition.

"The basic building block of computer microcircuits is the transistor, but it is currently very difficult to make diamond-based transistors," says Sam Weir, who leads development of the diamond-based sensors at LLNL.

Another hurdle is the cost of natural diamonds. (And you thought Extreme Edition Pentium 4s were expensive.) However, advances in diamond synthesis technologies are promising and could provide a supply of lower-cost diamonds that have the same properties as nature's own. Damon Jackson, Weir's colleague at LLNL, is optimistic. He believes that diamonds could begin appearing in computers, in the form of a heatsink, in five to 10 years.

"Diamond is not only very strong, but it is also a great thermal conductor," Jackson says, "so it can be used to help pull the heat away from the chip. This, in turn, can help reduce the amount of heatsink material currently used in computer chips, which will result in smaller overall devices." ▲

Back Door

Q&A With Cary Sherman

Cary Sherman has the unenviable job of being president of the RIAA (Recording Industry Association of America). Sherman's predecessor, Hillary Rosen, gained great fame and infamy (depending on your viewpoint) as the key person behind destroying the first incarnation of Napster. Sherman must now carry on the fight to defend the music business.

Q The RIAA has taken a massive rap over suing old people and 12-year-olds. Is the suit recipient selection process anonymous?

CS: We have no idea who it is. We're suing an IP address. We have no idea who's on the other end. Who would have thought that a 12-year-old would have been the account holder for a broadband account?

Q There are proposed schemes for full bit rate or at least truly CD-quality music being legally distributed via P2P networks that anyone can tap into, provided they pay a general licensing fee to some overriding P2P management organization, yet nothing has happened yet.

CS: Nothing has happened because it's not a very good long-term solution for the peer-to-peer problem. The most significant argument made for it is you can't stop it, so you might as well get paid for it. Well, the same thing can be said for movies traded on the Internet, and software, and video games, all of which you really can't control. You would ultimately need to turn to a compulsory license for every product that can be digitized and disseminated. You know, the copyright industries now account for nearly 6% of the GDP in the U.S. We're the No. 1 export. Are we going to replace that entire economy by a compulsory license fee that would be added to a monthly ISP fee or the price of a CD-R? How much would you have to pay in order to underwrite all of the motion picture industry, the software industry, and video games? Then you've got the fact that this is an international problem, so we'd pay in this country, and everybody in China and Germany would get it for free? It's a slippery slope, and nobody's figured out a way to actually come up with enough money to make the thing work.

Q So what's the fix? Because as we've seen, from the days of IRC through P2P, the darknet always thrives.

CS: It's a mistake to think that you've got to eliminate all piracy for the marketplace to sort itself out. Intellectual property industries live with piracy all the time. They always have. It's a question of keeping it under sufficient control so that legitimate businesses can still exist. If you take a look at some of the Asian countries, for example, where they had 90% piracy rates, there was no legitimate marketplace. But when you got them down to a 20% or 25% piracy rate, businesses started opening up, and local artists started being signed, and industries emerged. If piracy can be brought under sufficient control so that most people do the right thing and most people are still compensating creators, then the industry will continue to flourish, sign new artists, and give them the financial and resource support that they need to develop into the artist that they can be.

Q What sort of responsibility do you feel to the consumer world?

CS: The way that copyright is intended to benefit consumers is to make sure that creators get paid for their work so that they will continue to create. People don't think about that. They think of artists as being rich, spoiled brats. They have no idea that they're thinking about the top 10th of 1% of the music pyramid. Those are the names that everybody knows. But the music industry is such an extraordinary array of people who love music at every level—studio engineers, even people in CD plants, they all love music; it's why they pursue the careers that they do. Those people are the music industry. Anything that we can do to keep record companies investing in new artists, giving baby bands new opportunities, giving some new kind of music that hasn't found a commercial following yet an opportunity to be heard, that's a great thing. We all feel like that's what we're doing, and it may not be popular to have to do that, but think of the alternative. It's a whole lot worse.

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William Van Winkle began writing for computer magazines in 1996. He was first published in 1990, the same year he took his first job in computers. He and his family live outside Portland, Ore.

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